COLONY OF MAURITIUS

Annual Report

OF THE

Department of Agriculture

1948

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J. ELIEL FELIX, GOVERNMENT PRINTER
PORT LOUIS, MAURITIUS
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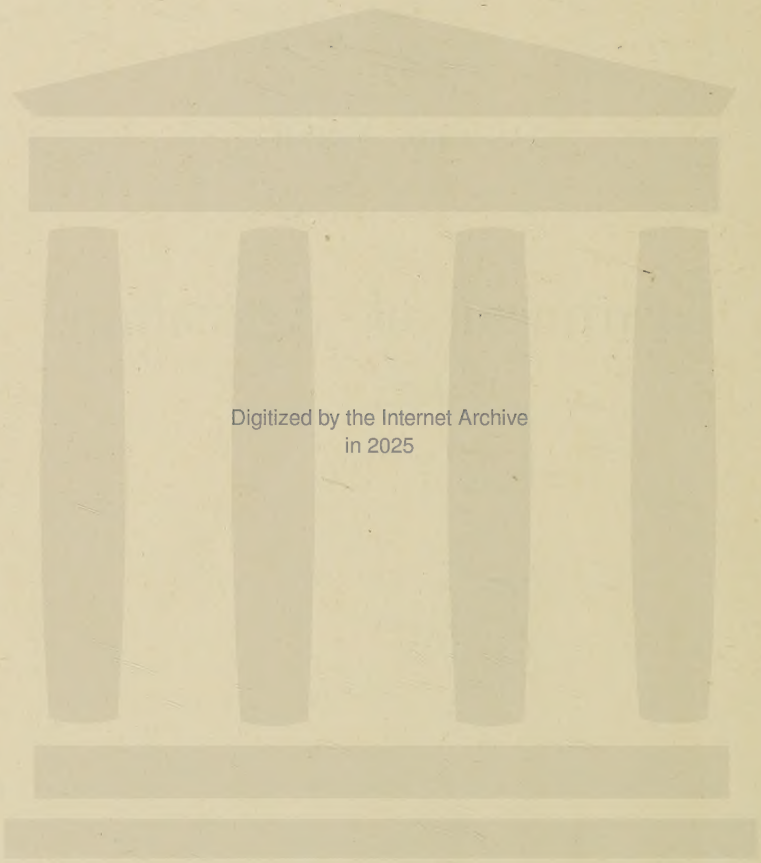

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Annual Report of the Department of Agriculture for the year 1948

Policy

The main objective of Government policy as it affects Agriculture may be defined briefly as the utilization of the island's land resources, whether in private or public ownership, to the best advantage in the interests of all its inhabitants.

The Agricultural Department is not the sole instrument of this policy. The Forestry Department, under the guidance of the Forest Board, is concerned not only with commercial timber and firewood production but with the maintenance under forest cover of watersheds, catchments, drainage basins, steep hill slopes, streamsides and river banks ; and with the lease for agricultural or other purposes of Crown Forest Lands. Leases of other categories of Crown Lands fall within the jurisdiction of the Public Works Department, and this Department is also deeply concerned in the preservation and development of the island's water resources, for domestic and industrial purposes, for irrigation and for hydro-electric power. The Food Production Board is concerned with practical encouragement of food growing and the utilization for this purpose of suitable lands not already in use.

An essential step towards co-ordination of effort was taken late in the year by the setting up of a Natural Resources Board, and by the end of the year the newly-created Board had settled down to a consideration of its own constitution, powers and functions. It is intended that the new body should supersede the old Board of Agriculture, many of the function of which have already been taken over by other boards and committees.

The direct contributions of the Agricultural Department towards the policy of more effective land utilization have consisted largely in experimental work with the object of improving the quality and yield, and extending the range, of economic crops, the supply of improved planting material, the provision of technical advice on crop production and animal husbandry, and control of pests and diseases.

Much of the research and experimental work has, rightly and with much benefit to the economy of the island, been concentrated on sugar cane. There is now need for greater work in other directions, particularly in regard to food crops, fibre and tea, the feeding of milk cows, and extension services for small planters and cow-keepers ; but it is essential that these developments should not interfere with or curtail the highly important work on cane. A start has already been made in the direction of increasing the yield of the small producer by the establishment of an extension service for small cane planters.

Lack of technical staff continued to be a major difficulty. Two more very able and experienced officers, the Plant Pathologist and the Botanist of the Sugarcane Research Station, left the Colony during the year ; the former on transfer to Nyasaland and the latter on secondment to Trinidad.

It is to a large extent these staff difficulties, accentuated by salary scales which are regarded as inadequate under present world conditions to attract and retain workers of the highest calibre, which have given rise to the proposal that sugarcane research work should be taken over by the industry. This proposal had the support of the Mauritius Economic Commission but it has been strongly opposed by certain sections of the community and the matter was still undecided by the end of the year.

In some respects, however, there was an improvement in the staff position. The Tea Officer and the Entomologist assumed duty early in January. The new Director of Agriculture arrived in May and the long vacant posts of Accountant to the Central Board and Animal Husbandry Officer were filled towards the end of the year.

The Sugar Industry

From a climatic point of view, the 1947–48 season was satisfactory and no cyclone, that occasional visitor of baleful repute, came sufficiently close to the island to occasion damage. Notwithstanding this immunity, there was nothing in the season to lead one to expect a record crop ; but such a crop was reaped. Both yields of cane and extraction of sugar proved unexpectedly high, and a total crop of nearly 392,400 metric tons of sugar was obtained from a harvested cane area of about 143,000 acres.

The previous record crop, some 348,500 metric tons of sugar, was that harvested in 1947. This coincidence of two outstanding crops is difficult to explain except on the assumption that it is not unconnected with the replacement by the cane M.134/32 of practically every other variety. The remarkable cane known as M.134/32 was bred at the Mauritius Sugarcane Research Station and released in 1937. By 1940, it occupied only 2 per cent of the area in cane ; by 1947, this figure had increased to 80 per cent, and in 1948, the variety occupied probably more than 90 per cent of the total cane area of the island.

Fortunately, M.134/32 shows no sign of weakening, but the danger of relying upon a single cane variety is fully realised. No new releases were made during the year but two varieties bred at the Sugarcane Research Station, both of which have M.134/32 as one parent and which give promise of even greater productivity than their distinguished ancestor, are nearing the end of their testing period.

In spite of difficulties due to staff shortage and accommodation which is still very far from adequate, the Sugarcane Research Station succeeded in getting through a very creditable volume of work during the year. In addition to the previous programme (which includes breeding work, field trials of locally bred and introduced varieties, problems of weed control, pre-planting treatment of cane cuttings, investigations on secondary crops, and fertilizer

trials with normal fertilizers and crushed basalt) two new lines of investigation were started. One of these is a study of the effect on cane of interplanting food crops. The island's food production could be materially increased if such interplanting were commonly practised on estates, but reliable information regarding the effect on cane is lacking and experimental evidence is needed before the practice can be advocated with confidence. The other consists of a new series of factorial experiments with lime, magnesia and potash, designed to provide information on the effect of lime and magnesia on the yield and sucrose content of cane and data which will enable the foliar diagnosis technique to be extended to include these elements.

The experimental work on weed control was completed and demonstrations of the methods found most effective under our conditions were conducted on estates and on large and small plantations.

The embryo extension service for small planters made a successful start in its important task, by carrying out a large scale survey of soil deficiencies on small planters' lands, establishing demonstration plots and inaugurating lectures at rural centres.

Manufacture of alcohol, a by-product of the sugar industry which may offer scope for further development, received considerable attention from the Sugar Technology Division of the Department. At the instance of the Mauritius Economic Commission, an enquiry into costs of production was carried out and, as a temporary expedient pending completion of legislation to deal with the matter, the Division undertook control of alcohol intended for export. This measure was taken as a result of complaints regarding the quality of alcohol received in the United Kingdom, and emergency regulations requiring the testing and grading of alcohol for export were brought into force.

Over nine and a quarter million litres of alcohol were distilled during the year and about five and a quarter million litres were exported.

The Central Board, which is charged with carrying out the provisions of the Sale of Cane Control Ordinance No. 97 of 1941, continued to be administered as a Division of the Department. A general review of the purpose and working of this important institution was given in the Annual Report for 1947. During 1948, the volume of work and the number of cases in which the Board acted as arbitrator increased very materially ; details of this work are contained in the report of the Registrar.

Fibre

Production of fibre from the plant known as Aloe or Mauritius Hemp *(Furcraea gigantea)* was again in the neighbourhood of 1,000 tons, of which about 101 tons were exported and the remainder processed into bags and filter cloth at the Government Sack Factory.

As a result of an agreement permitting the temporary employment of women at night the factory was able to work 15 hours a day during 260 working days and to produce over 854,000 badly needed sacks for the sugar industry. In addition, the factory produced over 93,000 yards of filter cloth for use in sugar factories and a quantity of yarn for the manufacture of rope.

The reports of Messrs. Lock and Lees*, which were received early in the year, give a very clear review of the industry's problems and indicate the lines on which development should proceed. Efforts are being made to overcome the first major difficulty, lack of an efficient decorticator for *Furcraea ;* an English firm of engineers has been asked to design a prototype for an automatic decorticator and the problem has also engaged the attention of local inventors.

Development of the industry also requires investment of very considerable capital for the establishment of plantations, rehabilitation of decorticating factories and enlargement of the processing plant.

The sugar industry, not unnaturally preoccupied with its own problems and the difficulties with which it may well be faced in the not far distant future, is disinclined to take an active part in the development of fibre or to join in a co-operative undertaking for the manufacture and marketing of sacks such as was proposed by the Mauritius Economic Commission.

A further increase in the price of fibre for delivery to the sack factory in 1949, which was decided upon by the Price Fixing Committee, appears likely to have a stimulating effect on production.

Another innovation was an agreement between the Sack Factory and the Hemp Producers Syndicate in accordance with which all fibre will be graded, pressed and baled at the Syndicate's baling factory and purchased from the Syndicate ; this arrangement, it is hoped, will benefit both parties.

Experimental work on fibre plants was started in a small way in 1945 by establishing variety trials of *furcraea,* sisal and blue sisal. Since then routine observations have been carried out in planted areas and data are now being collected in regard to the intervals at which cutting should take place and the factors which influence poling of *furcraea.* The work has not yet been in progress long enough to give definite results, but useful indications have been obtained.

Food Crops

The food production campaign, which was started in 1947, continued under the direction of the Food Production Board and resulted in a very considerable increase in the area planted to subsidised crops ; maize, root crops and groundnuts. Under the stimulus of bonus payments for planting and guaranteed prices for maize and groundnuts, an area of 14,610 acres was planted to subsidised crops and harvested in 1948 prior to 30th June ; the corresponding acreage for last year was 4,199 acres. A further 5,948 acres of subsidised foodcrops was registered in 1948 and harvested after 30th June. It is estimated that there were, in addition, over 2,600 acres in non-subsidised food crops (mainly rice and potatoes) and about 5,000 acres in vegetables, so that the total area planted to food crops of all kinds may have been in the neighbourhood of 28,000 acres.

*Reports on the Mauritius Fibre Industry, by G. Winslow Lock, O.B.E., and P.W. Lees, Publication No. 44, Government Printer, Port-Louis.

Planting of maize and root crops considerably exceeded the target but there was a serious set-back in groundnut production and the target of 15,000 acres was not reached. This was due largely to heavy incidence of bacterial wilt disease in the Virginia Bunch variety of which seed was introduced in bulk from Uganda. The local type of nut, known as " cabri," shows a high degree of resistance to the disease and seed is being bulked up for distribution.

The scheme has so far proved attractive to small planters but not to estate owners and much of the increase in acreage is due to the opening up of hitherto unused Crown Land and other land which is held by the cultivator on short, and frequently verbal, lease. Standards of cultivation and care of the land leave much to be desired and the Board is giving consideration to question of tenure and means of preventing soil depletion and erosion.

In spite of crippling staff difficulties, the Agricultural Division of the Department continued to contribute to food production work by means of propaganda and instruction, by conducting variety trials and other experimental work, and by providing planting material.

There are nominally four Agricultural Officers, in addition to the Senior Agricultural Officer, but in fact one was seconded as Executive Officer to the Food Production Board throughout the year, one acted as Tobacco Officer in addition to his normal duties, and one is normally stationed in Rodrigues, but this post became vacant owing to the retirement of the Officer concerned. In these circumstances, and as the Division is charged with such extraneous duties as the care of the gardens at Pamplemousses and Le Réduit, the volume of work which was carried during the year is very creditable.

There is, however, need to enlarge and strengthen the Division very materially if the agricultural problems of food production, which have received insufficient attention in the past, are to be seriously tackled.

Livestock

Progress in dairying and keeping of livestock depends to a considerable extent on the success of the food production campaign and the utilization of such by-products as cereal bran and oil cake for animal feed. Shortage and high price of feedstuffs is one of the main factors impeding development of dairying and the keeping of poultry, pigs and other small stock.

The large number of milk cows (the present number is not known but it may be somewhere in the neighbourhood of 15,000 or 20,000), are owned mainly by the " one cow man " and their diet consists almost entirely of green forage collected from privately owned lands and Crown Lands. Taking the island as a whole the fodder supply appears to be adequate for the present number of milk cows, but shortages occur owing to seasonal variations in quantity and quality (the small cow-keeper has no means of establishing a fodder bank, even if he had the knowledge and the will to do so, the distribution of cattle in relation to the available fodder, and certain difficulties in regard to access to fodder on privately owned land.

It may be that the only adequate solution of these difficulties will lie in the setting up of an organisation to produce hay at the lowest possible price in the regions best suited to its production, and the marketing of cheap concentrates prepared from the by-products of food crops.

Marketing of milk and the condition in which it reaches the consumer remain very unsatisfactory. A proposal for the establishment of a producer-consumer co-operative society, or " Milk Union," to undertake collection, processing and distribution of milk was under discussion at the end of the year.

The pure bred Friesian bulls, which are maintained by Government and stationed at stud throughout the island for improvement of local milk stock, were not as much used as had been hoped ; 1,050 services were carried out during the year. The reluctance of the small cow-keeper to make use of these animals is in part due to their weight and the fear of injury to the cow. This may be obviated by artificial insemination ; during the year a bull was trained for this purpose and experiments in storage of semen were completed in preparation for a campaign which it is hoped to start early next year.

The position in regard to diseases of animals remained unchanged.

Tea

There was practically no increase in the area planted to tea largely because of the lack of good seed, but production increased considerably owing to better methods of cultivation, young tea coming into bearing, and the reclamation of abandoned and semi-abandoned plantations.

There are indications that the production figure which has now been reached (617,322 lbs of black tea in 1948) is sufficient to meet the present internal demand, if indeed it is not already excessive, and further development of the industry will depend upon an increase in local consumption and the establishment of an export market. Recommendations in regard to a tea propaganda campaign to increase local consumption, and controlled marketing of tea, were made by Mr. H. G. Sandy, Commissioner of the International Tea Expansion Board of East Africa, who visited the island in April.

The establishment of an export market presents difficulties owing to production costs, which are conditioned partly by relatively high labour rates and yields at present low in comparison with those of other tea producing countries, and the small proportion of made tea which is of export quality.

The supply of green leaf is shared between five factories manufacturing black tea, of which one is modern and well-equiped but operates much below its production capacity, and the others are small and relatively inefficient. Captain de Mowbray's report* recommended the closing of the four primitive factories, in which he considered it impossible to manufacture good teas, and the substitution of another modern factory. Efforts to bring this about by co-operative agreement between factory owners were made, but no agreement could be reached and the matter remains unsettled.

The legislation dealing with the tea industry (Ordinance No. 37 of 1943) was revised during the year and a new Bill, which includes provision for controlled marketing of Mauritius tea for export and local sale, was prepared.

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*Report on the Tea Industry of Mauritius, by Capt. E.G.B. de Mowbray, C.B.E., R.N. retd.). Publication No. 34, Government Printer, Port-Louis.

Apart from marketing problems, one of the main factors limiting acreage increase is lack of seed. Efforts to import seed for planters were unavailing except in the case of Malaya from which a consignment was obtained ; unfortunately, owing to deterioration on the voyage, germination of this seed was very disappointing. An area of old tea of a good workable jat has now been reclaimed and cultivated for seed production.

Tobacco

In spite of much work directed towards production of flue-cured leaf suitable for export, the small tobacco industry continues to depend solely on the local market. One of the main reasons for this is the adherence of planters to the variety known as Amarello, which they will not abandon owing to the very high yields which it gives. In fact, the ordinary commercial varieties of flue-cured Virginia tobacco are still known in Mauritius as the " new varieties " and, although they yield as well as in other tobacco growing countries, they are grown reluctantly, on a small scale only, and on the direction of the Tobacco Board. Cultural methods, too, are commonly designed to give maximum yield rather than quality ; soil and climatic conditions appear to be by no means ideal for production of a high quality flue-cured leaf, costs of production are high, and growers have become accustomed to relatively high prices for inferior leaf on the protected local market. These factors seem to rule out any reasonable prospect of establishing an export market for flue-cured leaf.

The industry can survive on a stable basis only so long as production is controlled and limited to the amount which the local market can absorb. This control is exercised by a Government-appointed body known as the Tobacco Board which also fixes purchase prices to growers and sales prices to manufacturers.

The Board is also charged, unfortunately from some points of view, with such commercial undertakings as the purchase, handling, grading, baling, storage and sale of the entire crop.

There appears to be no insuperable reason why the industry should not continue on the present basis with benefit to the Colony, provided that the policy is one of catering for manufacturers' requirements—that is consumer demand—as far as it is possible to do so. Emergence of a more discriminating class of smoker may, however, increase the difficulty of disposing of certain of the present grades and it is a debatable point as to how far this tendency should be resisted by protective duties on imported tobacco and cigarettes.

The amount of leaf tobacco manufactured during the year was 441,670 kilos, of which 354,281 kilos was locally grown leaf and 87,389 kilos was leaf imported for blending.

The work of the tobacco station was again concerned largely with production of seed for distribution to planters, fertilizer and variety trials, and breeding and selection with the object of producing a strain or variety suitable for local conditions (which means, in effect, having the gross yield capacity of Amarello) and superior to Amarello in flavour. The range of varieties was increased by importation of seed of a Burley type from Northern Rhodesia, for which soil and climatic conditions appear to be suitable and which in present market conditions may offer some possibilities for export.

Agricultural Pests and Diseases

The white grub of sugarcane *(Clemora Smithi)* is still one of the island's major pests ; some severe local attacks were recorded during the year and outbreaks of lesser intensity were common. Experiments in the use of benzene hexachloride for control of the insect were continued, though so far without conclusive results, and the Associate Entomologist visited Morocco in a search for further parasites, of which the first consignments were received before the end of the year.

Importation of the West Indian moth borer parasite *(Lixophaga diatrææ)* for control of the spotted borer of cane *(Procera sacchariphagus)* was also continued and the parasite was released in six localities heavily infested with borer.

The result of these introduction will not, of course, be apparent for some time, and it is interesting to record one recent example of successful biological control. An egg parasite *(Anaphoidea nitens)* of the eucalyptus snout beetle *(Gonipterus scutellatus)* was introduced in 1946 and it is now evident that the parasite has reduced the status of *Gonipterus* to that of an occasional pest.

One of the most important tasks with which the Entomological Division is at present concerned is biological control of the plant known as *Herbe Condé* or black sage *(Cordia macrostachya)*.

This bush, which may have been accidently introduced about the beginning of the century, has now colonised much of the island, replaced large areas of valuable grassland, and become a major weed pest.

The insects which feed upon and control *Cordia* in Trinidad are being studied by Dr. Simmonds of the Commonwealth Bureau of Biological Control, and promising species are sent by air to Mauritius where they are again subjected to thorough feeding tests before release. The first species to be liberated, a leaf eating beetle *(Physonota alutacea)* proved unable to compete with the Mauritian fauna and failed to establish itself ; releases were discontinued in May 1948. A second beetle *(Schematiza cordiae)* was first released in March 1948 after the completion of feeding tests and has now established itself firmly. It shows no tendency to attack other plant species and it gives promise of success as an agent for the control of *Cordia*.

There were no serious outbreaks of sugarcane diseases during the year, a fortunate state of affairs which may be partly attributed to the fact that the cane M.134/32 is resistant under normal conditions to the three main diseases prevalent in the island.

A disease of tobacco hitherto unrecorded in Mauritius has been identified as leaf curl.

The Island of Rodrigues

A reconnaissance survey of agricultural conditions on the island of Rodrigues was made in October by a team composed of the Director of Agriculture, the Acting Conservator of Forests, the Senior Agricultural Officer and the Land Settlement Officer, and a report on the situation was submitted to Government after consideration by the Natural Resources Board.

The population of this small island, some 40 square miles in extent, has increased (apparently with little assistance from immigration) from a few hundreds to about 14,000 in the course of the last century.

Apart from some exports of cattle, small-stock, poultry and a little agricultural produce to Mauritius, agriculture is on a subsistence basis and conditions are strikingly similar to those of a greatly overcrowded African Reserve. The topography is dissected (in the apt description of a Medical Officer the island is " convoluted like a brain "), the amount of land suitable for cultivation is relatively small, and slopes of appalling steepness are cropped. Indeed, the pressure of population upon the means of subsistence is now such that unless an outlet for the surplus can be found, even anti-erosion works commensurate with the need and a revolution in agricultural methods are unlikely to be availing.

For many years, an agricultural station and stock farm have been maintained on the island ; anti-erosion work and propaganda and demonstration of improved agricultural methods have had some effect, but this has been largely offset by the rapid growth of population, the ever-increasing and urgent demand, the apathy of the people and the difficulties of applying conservative methods of farming to small plots from which only a bare subsistence can be scratched.

During the year, the Agricultural Department was further handicapped in the losing race by the retirement of the Agricultural Officer in Rodrigues and the difficulty of replacing him.

Fortunately, the season was a favourable one, there were no cyclones, and reasonable crops were reaped in spite of an outbreak of locusts *(Locusta migratoria migratorioides)*, against which a campaign was carried out by means of sprays and poison bait.

General

This summary of agricultural conditions and of the work of the Agricultural Department is amplified in the divisional reports which are given as appendices.

In addition to the Department, the Director of Agriculture has responsibility for the College of Agriculture, the Central Board, the administration of the Fisheries Branch, the Government Sack Factory and the Tobacco Board, and he is required to undertake a very considerable burden of committee work.

The task of assuming these duties would not have been an easy one but for the friendly and willing co-operation of all members of the staff of the Department and of the other institutions which I gratefully acknowledge.

I am also greatly indebted to the President and members of the Bureau of the Chamber of Agriculture, the President and Committee of the Hemp Producers Syndicate, and the planting community, for the very friendly and hospitable manner in which they have received the stranger in their midst.

W. ALLAN,
Director of Agriculture.

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2. Sugarcane Research Station.
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4. Agricultural Division.
5. Sugar Technological Division.
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Appendix 1

Statistical Division

1. Meteorological Conditions

Abundant and well distributed rain fell mostly during the first fortnight of December 1947, as a result of which the 1948 crop benefited by a good start. The first quarter of 1948 together with the months of May, June, and August were very dry, December was dry ; rainfall, however, was above normal in April, July, September, October, November. Temperature did not differ widely from the normal. The following figures illustrate the statements about rain and temperature—

Months	*Rainfall as % of normal*	*Temperature departure from normal °C*
January	62	+0·2
February ...	54	−0·2
March	72	+0·2
April	125	0·0
May	38	−0·2
June	49	+0·4
July	108	0·0
August	74	+0·2
September ...	139	+0·3
October	113	+0·3
November ...	140	0·0
December ...	77	−0·1

The island was not affected by cyclones except by a distant one which did no harm to the plantations. On the contrary, the rain accompanying it came in time to break the spell of very dry weather which the island had been experiencing since the beginning of the year.

Rainfall has been above normal in October and November and has given a very good start to the 1949 crop.

2. Sugar Production

The total cane crushed amounted to 3,158,291 metric tons against 2,800,483 metric tons in 1947. Cane yields have been on the whole above expectation. The mean extraction for the island was 12·42 as compared to 12·45 per cent for the last year. As a result, the total sugar manufactured was 392,383 metric tons compared to 348,531 metric tons for 1947.

There has been nothing strikingly good or bad in the climatic conditions to explain this record crop exceeding by nearly 44,000 metric tons the 1947 crop which itself was a record. The absence of cyclone during those two years cannot account entirely for two successive very big crops.

Wide differences between maxima and minima during the maturation season have been very favourable. The area under cane cultivation was 156,000 acres, 91 per cent of which were reaped. This is an increase of 10,000 acres on the 1947 figures and will account for the increased sugar production to a certain extent. The major factor to explain this record crop is most probably the locally produced M.134/32 with its inherent qualities which have proved to be outstanding both in the fields and in the factory.

3. Area Under Sugarcane

The area under sugarcane was estimated at 156,000 acres of which 142,980 were reaped. This was made up as follows—

	acres
Land cutivated by Estates	61,944
Estate lands cultivated by planters	10,916
Planters own land	70.120
	142,980

4. Sugar Market and Disposal of the Sugar Crop

The total of the sugar produced after deduction of 19,000 metric tons for local consumption was purchased by the Ministry of Food of His Majesty's Government.

The total sugar exported during the 1947–48 year (1.8.47–31.7.48) was 348,555 metric tons including 11,111 metric tons of the 1946–47 crop and 7,521 metric tons of the 1948 crop.

The amount exported during the period 1st August–31st December, 1948, was 251,149 metric tons including 8,204 metric tons of the previous crop.

The apparent local consumption was 18,632 metric tons.

5. Importation of Agricultural Machinery and Fertilizers

The above is shown in the accompanying tables—

A. Agricultural Machinery

	Tractors and Parts	*C.I.F. Rs.*	*Country of origin*
	17	263,043	United Kingdom
	32	625,511	U.S.A.
	4	36,808	Australia
Total ...	53	925,362	

	Ploughs and Parts	*C.I.F. Rs.*	*Country of origin*
	3	16,373	United Kingdom
	8	31,409	U.S.A.
	2	45,963	Australia
Total ...	13	93,745	

B. Fertilizers

Quantity (in kilos)	*C.I.F. Rs.*	*Country of origin*
11,401,857	2,948,713	United Kingdom
7,930,100	2,056,228	Chile
1,689,608	509,501	France
661,700	226,309	Belgium
21,683,265	5,740,751	

6. Tobacco

377,928·3 kilos of tobacco valued at Rs. 913,699.09 were manufactured during 1948 made up as follows—

Air-cured Kgs.	*Value Rs.*	*Flue-cured Kgs.*	*Value Rs.*	*Total Kgs.*	*Total Rs.*
83,763	120,098.29	294,165.3	793,600.80	377,928.3	913,699.09

An export quota for the production of 1,100 kilos was granted to Rodrigues against 4,000 for last year. The production was of 258·1 kilos only owing to drought conditions and labour shortage.

Area planted in tobacco—

	arpents
Flue-cured	431·08
Air-cured	122·39
TOTAL ...	553·47

The amount of leaf tobacco used in manufacture was—

	hgs.
Local	354,281·2
Imported	87,389·0
TOTAL ...	441,670·2

7. Fibre, Tea, Vegetable Oil (coconut and groundnut)

Fibre. The following illustrate the activities of the Sack Factory—

No. of fibre factories at work	25	
SACK FACTORY :		
Fibre received	852,304	kgs.
Fibre consumed	1,072,919	kgs.
Bags of 80 kilos	854,067	units
Filter press cloth...	93,093	yards
Other cloth	6,404	yards
Fibre used for rope manufacture ...	55,537	kgs.
Weight of fibre exported	101,224	kgs.

The Sack Factory has been working an average of 15 hours per working day which totalled 260.

Tea. The area cultivated in tea was 2,031 acres as compared to 2,010 in 1947. The tea produced amounted to 562,568 lbs. (500 grams) showing an increase of 58,009 lbs. on the previous year. This increase is due partly to better cultivation, and mainly to the new plantations which having grown up, give increasing yields.

Oil. Innova Ltd. manufactured 1,126,135 kilos of refined coconut oil and 58,720 kilos of groundnut oil. It also made 289,350 kilos of soap.

8. Livestock

The following table shows the importation of cattle, sheep, goats, etc., together with the value—

Animals	*Number*	*C.I.F. Rs.*	*Country of origin*
Bullocks	5,837	1,651,430	Madagascar
Cows and Oxen ...	306	37,500	Rodrigues
Bulls and Cows ...	11	14,300	Australia
TOTAL ...	6,154	1,703,230	
Goats	3,168	68,454	Rodrigues
Sheep ...	1,325	81,500	Australia
	1,346	36,674	Rodrigues
TOTAL ...	2,671	118,174	
Pigs ...	1,819	104,010	Rodrigues
	26	780	Other Dependencies
TOTAL ...	1,845	104,790	

In addition 26 race horses for a value of Rs. 195,000 were imported from France, and one dog valued Rs. 650 by plane from United Kingdom.

9. Alcohol

The volume of alcohol distilled during the year was 9,283,623 litres of which 5,257,366 litres were exported.

J. R. LAGESSE,
Statistician.

Appendix 2

Sugarcane Research Station

A brief summary of the work which has been performed during the year under review follows, a full report being published separately.

Taking the shortage of staff into consideration, satisfactory progress has been made in all directions.

The Extension Service, to which a Senior Field Demonstrator and three Field Demonstrators have been appointed has made a start on the all important work of trying to improve the yields obtained by small planters, a most fruitful line to pursue.

I have to express my thanks to all members of the Station for their loyal and hearty co-operation, and to all members of the planting community who have done so much to further our work

N. CRAIG,
Deputy Director of Agriculture,
and Officer-in-charge,
Sugarcane Research Station.

Geneticist Division

The arrowing season was characterized by a scarcity of arrows in the breeding plots with the result that crossing could not be carried out as contemplated. The total number of crosses made at Réduit, Pamplemousses and Hermitage was 173. New parent varieties were used such as, for example, the best Indian varieties imported from Trinidad a few years ago.

The germination of the fuzz from the Réduit crosses was generally satisfactory but very poor in the case of the Pamplemousses and Hermitage crosses. However, a sufficient number of seedlings could be raised to carry out large-scale seedling trials at the three experimental stations. Field plantations of the seedling populations were completed at the end of December despite the prevailing dry conditions ; from a total of about 28,000 seedlings obtained, approximately 21,000 were planted out in the field.

Selection from the seedling populations was carried out in virgins and ratoons and a large number of seedlings selected and planted in propagation plots prior to further testing in second-trials, a new method being used for laying out these plots. The object of planting a large number of seedlings in propagation plots is to increase the probability of finding a superior variety.

Research work on seedling selection in the ratoon stage was pursued with interesting results.

Second trials were laid down to test virgin and ratoon selections and previous years' trials harvested in virgins and ratoons. Particular consideration is given to the ratoons' results as one of the main problems of sugarcane breeding in Mauritius is the production of a variety possessing good ratooning qualities and capable of competing with the standard cane M.134/32 now occupying nearly 90 per cent of the cane area.

Approximately eleven third-trials were harvested and a certain number of seedlings selected therefrom for further observations ; only one trial was planted at the Pamplemousses Experiment Station.

A considerable number of field-trials were laid down on sugar estates comprising particularly the recently imported Bardados varieties B.3337, B.3439, B.34104, B.37161, B.37172 and B.4098 and the Sugarcane Research Station varieties M.213/40 and M.423/41. Two promising varieties, namely E.1/37 and E.26/42 bred at Ebene estate have, in addition, been included in a few of these trials.

Three trials containing the above mentioned West Indian canes were reaped, one at each experimental station, the results indicating that three of them, viz., B.34104, B.37161 and B.37172 appear, in general, the most promising ; these trials have been allowed to ratoon. With regard to the other field-trials harvested during the year under review, research was focussed on the varieties M.213/40 and M.423/41 both of which show very considerable promise. The results obtained with these two varieties in third and field-trials, in virgin and first ratoons, for the past four years show that both of them, particularly M.423/41 from the economical standpoint, are two

promising varieties having considerably surpassed the standard variety M.134/32 with regard to both yield of cane and sugar. Their release for commercial propagation is under consideration and, pending a decision, propagation plots have been planted in many localities.

The following varieties imported from overseas were planted in the quarantine greenhouse at Réduit at the beginning of the year: the Canal Point varieties C.P.34–120, C.P.36–13 and C.P. 36–105, the Queensland variety Q.28 and the famous Hawaiian cane 32–8560. Tests have been performed by the Plant Pathologist of the Department of Agriculture to detect the presence of Mosaic disease with negative results. A second generation was established in the greenhouse in September ; the canes are making good growth and planting material for propagation will be available in the near future.

Photo periodism experiments to induce arrowing in the variety B.H.10/12 were, for the first time, conducted by the Division but with negative results. A second series of experiments was started at the end of the year.

Fuzz from three crosses made during the crossing season was exported to Egypt and cuttings of several varieties were exported either by air or by sea to 10 different countries ; a few cuttings of M.134/32 and M.63/39 were, in addition, dispatched by air at intervals of three months to England for the London Exhibition to be held in 1949.

A. DE SORNAY,
Geneticist.

Extension Service

During the year under review, the work of the Extension Service was conducted by one Senior Field Demonstrator with the help of three Field Demonstrators.

One Field Demonstrator was in charge of the districts of Grand Port and Savanne, another of the districts of Moka and Flacq and the third of the northern districts.

The work carried out by the Service may be summarised as follows—

(a) Foliar Diagnosis: Leaf samples were taken from about 670 different cane fields belonging to small planters. The analysis of these samples has been made in the laboratory of the Sugar Industry Reserve Fund. The results obtained have shown a marked deficiency in N., P., K., in general ; although the dry conditions that prevailed during the normally wet period may have accentuated these apparent deficiencies, it may be stated that they do actually exist. A large number of small planters could be induced by the Field Demonstrators to take advantage of the fertilizers supplied to them.

(b) Demonstration Plots: 8 demonstration plots started in 1947 or earlier and combining different manurial treatments with the varieties M.165/38, M.63/39, M.76/39 and M.134/32 have been followed during the crop. A series of new plots has been laid down with ratoon canes in order to show expenses of a balanced and adequate manurial treatment.

(c) Demonstrations of chemical treatment of weeds have also been made on a number of small planters' lands. Probably there is a large scope for improvement in this line.

(d) Propaganda in connection with subjects treated in paragraphs *(a)*, *(b)* and *(c)* above has been made by means of lectures delivered by Field Demonstrators in appropriate rural centres ; on many occasions advice has been given to individual planters. It must be pointed out that, as a rule, planters of five acres or above are those who seem more anxious in improving their cultural methods.

(e) During the crop time, one of the Field Demonstrators was attached to the experimental cane mill and carried out all the cane analyses of the Station

(f) The writer, in addition to the supervision work of the Extension Service, assisted the Geneticist in the cane breeding work.

G. MAZERY,
Senior Field Demonstrator.

Botanical Division

The work on weed control, carried out by the Botanical Division, mainly aimed at demonstrating the weed control methods to big and small planters and to estates, using methods which had been found most suitable, as a result of work previously accomplished. Exploratory work was also carried out on certain weed species which have proved difficult to control and on other weed species on which no data had been previously obtained. Comparative tests carried out with several herbicide preparations on some of the weed species seem to point out that for every susceptible weed there is relatively little difference between the various forms of 2–4 dichlorophenoxyacetic acid and the 4 chloro 2 methylphenoxyacetic acid used provided that weather conditions are favourable when the applications are made. The chief consideration would then be the price of the products based on the equivalent active content.

The 3 × 2 × 2 factorial experiment laid down at the Hermitage (Highlands S.E.) in October 1947 with a view to investigating the fertilizing value of crushed basaltic rock has first shown the following data—

Basalt Tons per arpent	*Cane Tons per arpent*	*% Control*	*C.C.S. % cane*
0	31·9	100	10·15
91	33·5	105	9·97
182	36·3	113·8	9·65

Significant difference (20 : 1) ± 2·3

From these figures it may be inferred that a significant increase in yield of canes was obtained with an application of 182 tons of basalt per arpent over both an application of 91 tons per arpent and no basalt ; but no significant increase was obtained with the single application of 91 tons per arpent.

Sucrose content, however, responded differently, for with increasing applications of basalt a corresponding decrease in these values was obtained.

Six trials laid down on the latin square system of replication have been established in different localities with a view to obtaining the yield effects of inter planting food crops with sugarcane. The food crops, so far, included in these trials have been sweet potatoes, eddoes, potatoes, maize and groundnuts. The experiments are in progress and no information is, at present, available.

Cultural investigations on secondary crops have been another line of research work in which the Botanical Division has been engaged this year. Multiplication plots have been carried out at Richelieu Tobacco Station on varieties of Sorghum imported from the United States with the main object of obtaining seeds for further investigations later on. Fertilizer, variety and time of planting trials have been laid down at Réduit and Plaines Wilhems Experimental Stations with linseed, soya and oats. Information obtained from such trials may later prove of value when large scale plantations with these crops are contemplated.

Experiments on the use of organo-mercurial compounds in the pre-treatment of sugarcane cuttings have been further investigated in co-operation with the Plant Pathology Division of the Department of Agriculture. The main object of these investigations was to carry out comparative tests on the relative efficacy of the various sugarcane disinfectants, organo-mecurial and other compounds. Although all the treatments gave an increase in the number of shoots germinated and reduced the incidence of the pineapple disease, Aretan and Abavit " S " were outstandingly the best treatments.

E. ROCHECOUSTE,
Assistant Botanist.

Chemical Division

The main line of work has been the maintenance of the series $3N \times 3P \times 3K$ experiments on estates. Sixteen such trials, distributed throughout the different climatic zones of the island, were harvested this year and the normal fertilizer applications made. Leaf samples which had been collected the previous year, together with those collected this year, were analysed for N, P_2O_5 and K_2O with a view to determining the optimum content of these elements in the leaf punches in connection with the foliar diagnosis technique.

A summary of results is given below—

(1) One trial gave a definite response to phosphate and two other trials gave a slight response to potash, which response, however, failed to reach significance. In the case of Nitrogen, the response was still higher than in previous years, and in one case the double dose of N (i.e. 60 kilos N/arpent) gave as much as 2·3 times the yield of the plots receiving no Nitrogen.

When considering the whole series together, the following data are obtained—

	0 N	*1 N*	*2 N*	*0 P*	*1 P*	*2 P*	*0 K*	*1 K*	*2 K*
Virgins	100	112	113	100	98	98	100	102	103
1st. Ratoons (1947) ...	100	130	133	100	101	101	100	103	104
2nd. Ratoons (1948) ...	100	137	145	100	101	102	100	102	103

It will be noted that in spite of having withheld phosphate and potash for three consecutive years, the fertility level in those elements is still very high.

(2) The optimum contents of N, P, and K. in the leaf punches have been found to be lower in ratoons than in virgins. After consideration of all the data collected during the two ratoon crops, the following figures have been adopted, which represent the contents of the leaf punches in N, $P_2 0_5$ and $K_2 0$ below which a response in yield can be expected after application of the appropriate fertilizer.

The corresponding figures for virgins are also given for the sake of comparison—

	% Dry matter (leaf punch)	
	Ratoons	*Virgins*
N	1·85	2·10
$P_2 0_5$	0·45	0·50
$K_2 0$	1·40	1·50

In addition, the Chemical Division has undertaken a new series of factorial experiments with Lime, Magnesia and Potash on a $3 \times 3 \times 3$ basis. These trials may prove valuable in providing more precise information on the effects of Lime and Magnesia on the yield and sucrose content of sugarcane in the island and may allow for data to be collected with a view to extending the foliar diagnosis technique so as to include Ca and Mg, should this be found of interest. Five such trials have already been planted and a few more are being established so as to cover all climatic zones of the island.

S. M. FEILLAFÉ,
Assistant Chemist.

Appendix 3

Central Board

In 1948, the Central Board was set up with Mr. N. Craig, Deputy Director of Agriculture, as Chairman, together with the following members—

Millers' Representatives — Mr. A. Wiehe, Factory Manager of Labourdonnais Sugar Estate; Mr. E. Julienne, Manager of Réunion Sugar Estate.

Big Planters' Representatives — Mr. P. Lagesse of Eau Bleue Estate; Mr. M. Souchon of Espérance Estate.

Small Planters Representatives — Hon. A. M. Osman, O.B.E., of Notre Dame; Mr. Dewkumar Reetoo of St. Julien d'Hotman.

Staff

Registrar	J. R. Avice, A.R.T.C., (Glasgow), DIP. AGRIC. (Mauritius).
Accountant	J. H. W. Neal, F.I.A.C., A.A.I.A., A.M.I.I.A., A.C.C.S., (appointed October 1948).
Assistant Registar and Chemist...	C. Mayer, B. Sc. (Eng.) (Rand), DIP. AGRIC. (Mauritius).
Assistant Chemist ...	P. J. Galea, DIP. AGRIC. (Mauritius).
Investigational Officer and Weighbridge Inspector...	L. Colin.
Senior Test Chemist ...	S. Belcourt, DIP. AGRIC. (Mauritius).
Clerks	N. Chelin, M. Pitchen, S. Chuttur.

2. The Central Board had a particularly busy year and had to deal with serious problems of great interest to the Sugar Industry.

Meetings of the Central Board

The Board held 28 meetings. The main business dealt with may be summed up as follows—

3	meetings	relative to assessment of planters'sugar.
12	,, ,,	protest against assessment of planters' sugar.
6	,, ,,	changes of delimitation.
1	meeting ,,	disputes between millers and planters.
1	,, ,,	disputes between carters and miller.
1	,, ,,	shortage of sugar bags.
1	,, ,,	delivery of canes.
1	,, ,,	general business.
1	,, ,,	cost of transport of canes.
1	,, ,,	settlement of canes.

Registration of Cane Contracts

5,233 cane contracts, out of which 3,933 were on a provisional basis, relative to thirty factories were registered during the year. All the factories in the Island are at present crushing planters' canes.

Delimitation of Factory Areas

24 applications were received for changes of delimitation of factory areas. In 17 cases, the requests of the planters were granted.

As a result of the closing down of Terracine, the lands belonging to that estate have been included in the factory area of Union St. Aubin. The canes belonging to Rivière des Anguilles Estate and those of the small planters of Rivière des Anguilles and formerly included in the factory area of Terracine have now been directed to Bénarès factory. The canes grown at La Martinière, Surinam, Jurancon and Terrain Pava have been included in the factory area of Saint Félix Sugar Estate.

The Board had for the first time since its existence to give a decision in the case of a factory asking for an estate situated in another factory area to be included in its factory area, on the ground of ownership. The factory where the estate was situated objected to the demand. The Board decided that in cases of that nature consideration should be given to the following factors—

1. Right of ownership.
2. Economy of the factory which purchases the lands.
3. Economy of the factory liable to lose the canes.
4. General economy of the sugar industry.

Sugar Factory Licences

Previous to the beginning of the crop, permits were issued to all factories and new plans were supplied to those factories the areas of which had been altered.

Permits to Middlemen

The number of middlemen carrying on business has gradually dropped from 61 in 1939 to 29 in 1947, but the number is now on the increase, 34 permits being delivered during the year.

Investigations

50 investigations were carried out by officers of the Board relative to the delimitation of factory areas and to disputes between millers and planters, and many disputes were settled amicably.

Control of Cane Weighbridges

A total of 166 weighbridges used for weighing planters' canes have been tested during the year under review and 97 were found on first inspection to be accurate and in good working order ; but 45 weighbridges were found to be inaccurate and had to be adjusted to conform to the standard of accuracy laid down in Government Notice No. 92 of 1942, and a further 24 weighbridges found to be in bad working order had to be re-examined. Of these, 14 were found to conform to standard upon the second examination, 3 others were adjusted and corrected, the remaining 7 having to be re-examined a third time. At the third examination, 2 weighbridges were found accurate, and 4 more had to be corrected, one being found unsuitable for further service. An obsolete weighbridge at Plaine Magnien condemned by the Inspector last year has been replaced by another weighbridge in sound mechanical condition. One weighbridge with dial, scale and visual reading has been erected at Beau Plan this year. It is the first of its kind introduced in the Colony, and has given complete satisfaction. Such a weighbridge fitted with electrically operated ticket printing headwork would give complete protection in weighing. During the year under review 253 surprise checks were carried out on the various weighbridges in the Colony and 428 vehicles which had been previously weighed were reweighed. In 423 cases, the weight recorded in the weighbridge books was found to be correct ; in 5 cases the weight recorded did not tally with that found by the Inspector and the responsible weighers were prosecuted. 95 check tests were performed at the different weighbridges and only 4 were found to be slightly inaccurate, the necessary repairs being immediately effected.

Following complaints received by the Central Board and the Labour Department concerning delays of carts at weighbridges, a Committee was appointed in 1947 to consider the question and to make recommendations to the Central Board for the minimising of delays in the future.

The Committee which sat under the Chairmanship of Mr. H. H. Armstrong, Assistant Labour Commissioner, was composed of—

2 representatives of the Central Board.
2 representatives of estate managers.
2 representatives of small planters.
2 representatives of carters.

After having thoroughly studied the question in a spirit of co-operation, the Committee submitted to the Central Board certain recommendations which were approved by the Board. These recommendations were put into full effect during the 1948 crop with very good results. With the exception of one factory which began its crop very late, the undue delays at weigh-bridges were brought to a minimum.

Cost of Transport of Canes

The cost of transport of canes by tramway in Mauritius was calculated as usual. The average cost per ton mile for the 1947 crop amounted to Re. 1. as compared to 81 cents and to Rs. 1.25 for the 1946 and 1945 crops respectively. The cost as compared with the previous year has increased, though there has been an increase of 8½ per cent in the number of ton-miles transported. The higher cost of transport is due to fluctuation of individual items making up the cost. A comparison with the figures of the previous years reveals that—

	%
Tramway wages has increased by	9
Repairs to buildings has increased by	72
Repairs to locos and wagons has increased by ...	30
Cleaning, repairing tramlines etc. has increased by	40
Tools and stores has *decreased* by	21
Lubrication and fuel has increased by	18
Sundry expenses has increased by	43

Transport of canes by lorries can apparently be done at a lower cost than by tramway, and it is to be expected that more planters' canes will be transported by lorries in the near future resulting in a continued rise in tramway costs due to a decrease in the ton-miles transported. Another problem to be faced is the unloading of a larger number of lorries in the factory yard, and the stacking of canes for crushing during the night.

Cost of Production for Cane and Sugar

Costs of production in respect of cane and sugar will be worked out in the future following the appointment of an Accountant to the Board and it is also hoped to make suggestions for improving the financial recording in the industry resulting in benefits to all concerned.

Sound book-keeping and accounting practice is therefore to be greatly encouraged in order that maximum efficiency be achieved throughout the industry.

Sucrose Content Determinations

The Central Board maintained a cane testing service at 24 factories and 2,450 sucrose content determinations were carried out on planters' canes. As is the rule small planters had to be grouped in cases where individual supply was not adequate. In addition to the three chemists, five temporary cane-testers were employed, one of whom was stationed full-time at a factory. Again we need be thankful to the College of Agriculture for providing us

with temporary test chemists who are usually drawn from the final year class, or who are but recently qualified chemists. Working at the Central Board during the crushing season gives them a good opportunity of becoming acquainted with conditions in various factories. Owing to the large demand for sucrose content tests and conditions obtaining in factories, the method of working out planters' extraction was based largely on ' short tests ' (Revue Agricole—Nov-Dec. 1942). However, ' long tests ' are still performed whenever possible and it is interesting to note the close agreement between the two methods. The mean difference between values of sucrose content by the two methods based on 280 determinations was 0·05. Another batch of 68 determinations gave a difference of 0·02.

The fibre content of cane samples was carried out as usual at the Central Board Laboratory, Réduit. New equipment in this field is a case-hardened steel shredder manufactured at Plaine Lauzun works which has given very satisfactory results.

The average sucrose extraction per cent cane was slightly less than the record figure obtained in 1947. The sucrose content of planters' canes in general compared well with the millers' produce. Although the M.134/32 variety predominates, white Tanna, B.H.10/12, P.O.J. varieties are often seen. It has been observed in many places that the quality of the planters' canes is deteriorating. Big planters' canes especially contain a relatively high proportion of trash, roots, tops, etc., presumably due to labour difficulties, and the attention of all concerned cannot be too frequently directed to the bad effect of trash etc., on the extraction of sugar. On the whole, it can be stated that the cane-testing service has experienced a very busy year.

Assessment of Planters' Sugar

A greater number of interested parties than usual protested against the assessment of planters' sugar made by the Board for the 1947 crop, and both millers and planters have expressed dissatisfaction. Three cases of general interest might be mentioned here.

The Small Planters Association of Mauritius protested against the figures arrived at by the Board for all factories. Their contention was that—

(i) Planters delivering canes at the factory yard should not be made to contribute towards the cost of transport of planters delivering canes at a distance from the factory and transported by the miller.

(ii) Planters should be paid on a yearly extraction and not on a five-year average extraction.

(iii) The amount allowed to millers to meet cost of transport of planters' canes by tramway was excessive.

With regard to the first point, the Board was of opinion that if the method adhered to up to the present was suddenly altered, an important number of small planters situated at a long distance from the factory might stop cultivation, and the general economy of the industry would be affected. The Board however decided to give special consideration to cases of planters

delivering canes at the factory yard by their own means at a high cost of transport. The Board further decided that all interested parties would be given an opportunity of expressing their views on the question and that the matter would be reviewed before the 1950 crop.

As regards the second point, the Board considered that calculations based on yearly figures would result in important fluctuations from year to year in the amount to be paid to planters. Here again the Board would be willing to consider the desirability of altering the method adopted provided they are satisfied that it is the wish of the majority of the interested parties.

Finally, the Board having regard to figures produced relative to cost of transport by estate tramways, were unable to agree that the amount allowed to millers was excessive.

The second case of protest came from a group of millers whose contentions were—

(i) The cost of transport allowed by the Board to millers to meet cost of transport of planters' canes by tramway bears no relation to actual costs, as an average for the Colony is worked out. The amount allowed to millers being insufficient.

(ii) Cost of bagging. Having regard to the fact that the price of sugar for 1947 was fixed by taking into consideration the increased cost of bagging, that increase should be borne by the planter.

(iii) The cost of manufacture of sugar had increased in a higher proportion than the cost of production of cane.

As it was not possible to work out figures to ascertain whether the planter had been favoured in the apportionment of sugar without considerable delay, the Board decided to maintain the original assessment on the understanding that the figures produced by the millers would be analysed for future guidance.

The third case concerned a factory that had closed down, the contention of a number of planters being that, whenever factory A closes down, and the canes are crushed by factory B, factory B should transport free of cost planters' canes from the delivering stations of factory A to factory B. The Board considered that the point put forward could not be accepted *ipso facto* but that due consideration had to be given to the cost of transport of canes from factory A to factory B on the one hand, and to the benefit derived by factory B due to the crushing of a larger amount of canes on the other.

Cane Varieties

Factory tests of the new varieties of canes M.165/38, M.63/39 and M.76/39, which had been released in September 1945, carried out with the help of the Sugar Technological Division, revealed that they had proved somewhat short of expectations at the factory. The performance in the field however was exceptionally good, and it was decided that further tests should be carried out during the 1948 crop so as to have more definite information on their economical value. Planters were advised to adopt a go-slow policy, and to consult their respective millers before making any further plantations of these new cane varieties.

Improvement of Chemical Control in Sugar Factories

Under the terms of Ordinance No. 4 of 1948, which was enacted in January 1948,millers have to provide weighing scales for juice and water imbibition. Due to difficulties of manufacture and supply, a delay in delivery up to 1950 has been given for the installation of the juice scales, and up to 1952 for water scales. Under the terms of the same ordinance, methods of sampling, analyses and recording of figures recommended by the *Société des Chimistes*, and adopted by the Central Board, shall be applied by millers for the chemical and industrial control of factories. A booklet prepared by the Committee for the standardisation of chemical control (under the chairmanship of the writer) entitled. " System of Chemical Control for Sugarcane Factories " which contains the methods of sampling, analyses etc., to be applied was published during the year. The steps taken will no doubt lead to higher efficiency in factories through more uniform and better control. The carrying out of sucrose content tests by the Chemists of the Board will also be facilitated.

R. AVICE,
Registrar, Central Board.

Appendix 4

Agricultural Division

The Division worked at reduced strength during the whole year. Mr. E. Lesur, Agricultural Officer, was appointed Acting Tobacco Officer in addition to his normal duties. Mr. A d'Emmerez de Charmoy, Agricultural Officer, who was in special charge of experimental work on food crops and certain industrial crops, like fibre, was again fully occupied with the Food Production Board. A post of Agricultural Instructor remained vacant for the greater part of the year. Mr. P. Guerandel has been appointed to fill this vacancy. At the end of the year, Mr. C. M. Courtois, Agricultural Instructor, was seconded for duty in connection with anti-malarial work. Mr. R. Jauffret, Agricultural Officer, Rodrigues, was granted three months' leave prior to retirement. He has served in Rodrigues for twenty years. The Senior Agricultural Officer visited Rodrigues in October in company with the Director of Agriculture.

2. Experiment with Furcraea

The experiment laid down at Chaumière in 1945 with a view to compare the behaviour of sisal with that of *Furcræa* has already given useful indications. Last year, each plot was subdivided into three sub-plots from which the leaves were to be cut at intervals of six, twelve and eighteen months. The eighteen months' interval appears too long, but it is still too early to comment on the observations already made.

Poling of *Furcraea*, about which so little is known, was particularly abundant this year. Advantage was taken of this occurrence to effect counts under various conditions so as to obtain some indication of the incidence of pole

formation under shade and under conditions of exposure to sunlight. Aloe growing wild at Sorèze in association with *Cordia macrostachya, Leucœna glauca, Albizzia Lebbek* and *Litsea glutinosa* had poled to the extent of 41·3 per cent. At Beaux Songes, with practically the same plant association, poling had occurred up to 39·4 per cent. The most interesting and illuminating result was obtained from a regular plantation aged about 5 years at Beaux Songes. Fourteen rows of 35 plants each, growing at intervals of 5 ft. × 5 ft., with *Casuarina equisetifolia* at intervals in every fourth row, were counted. In the rows in which filao was growing, very little poling had occurred—5.4 per cent. In the rows, more exposed to sunlight, poling had taken place to the extent of 88·8 per cent.

In view of the suggestion that *Furcræa* would probably yield more fibre when growing fully exposed to the sun—a view which might hold good for any one particular cut—caution is indicated in the complete removal of shade as the total fibre yield over the life-cycle of an aloe plantation will be higher under conditions which tend to delay poling. The natural association of *Furcræa* with *Leucæna* may have, after all, more than one hitherto unsuspected advantages.

3. Tung Oil

Notwithstanding the fact that the Tung tree is unlikely ever to prosper in the island, seeds of improved types of *Aleurites montana* were received from Nyasaland for the establishment of a few observation plots. 74 seedlings have been obtained some of which will be planted at Abercrombie, some at Réduit and others up-country.

4. Experimental Work on other Crops

(a) Potatoes

(i) " Seed " of the " Up-to-date " variety was received from East Africa and two trials were laid out, one at Réduit, the other at Pamplemousses. The highest yields, at Réduit—where blight disease caused appreciable damage—were obtained from whole sets (4 tons per acre), whereas the plots planted with cut pieces gave 2·5 tons on the average. At Pamplemousses, where it was possible to lay down a properly randomised trial, results were as follows:—

	Small uncut seed pieces	*Large seed pieces uncut*	*Large cut pieces, aretan-treated*	*Large, uncut, untreated with aretan*
	(Tons)	*(Tons)*	*(Tons)*	*(Tons)*
Yield per arpent	6·5	7·6	5·5	4·7
Weight of seed per arpent	1·1	1·5	1·0	1·0
Net yield per arpent ...	5·4	6·1	4·5	3·7

(ii) Seed tubers of the so-called " Malgache " variety, which had been carried over from the previous year by means of cold storage at 5°C were planted at Pamplemousses at the same time as the "Up-to-date " variety. The yield obtained was 6·6 tons per arpent. The original parent seed dates from 1945 when the cold storage experiment was initiated.

(iii) The " Up-to-date " seed received from Africa was rather on the large size and some of it had to be cut. Advantage was taken of this to treat some of the tubers with aretan. At Réduit, the treated plots gave, in one instance, a smaller yield than the untreated ; in another trial, the reverse was the case. At Pamplemousses, the aretan-treated plots out-yielded the non-treated seed by about one ton per arpent.

(iv) An experiment was started to test the effect of " fusarex " on stored potatoes. This is still in progress but, at the time of writing, there is no definite indication that the treatment has had an appreciable effect on either the keeping qualities or the sprouting tendencies of the tubers.

(v) It is worth noting that, contrary to adopted practice in Mauritius, the trial at Pamplemousses was irrigated after the young plants had become established. Four times water was thus applied. The plants were sprayed preventatively against blight with Burgundy mixture and there was but little disease. Irrigating potatoes is a practice which might well be adopted wherever water is available in sufficient quantities in localities suitable for potatoes. Certain plots were sprayed with " Perenox," which afforded as good a protection against blight as Burgundy mixture.

(b) Soya

(i) Several varieties of soya bean were again grown at Pamplemousses for comparative yields, while new varieties received were propagated for further trial next year.

The first trial was laid down on 7th May, 1948, and harvested in July–August, the crop occupying the land a total of 105 days. Holes were 12 inches × 12 inches apart. Germination was good but a severe attack of the flea beetle—*Luperodes quaternus*—hitherto of rare occurrence in Mauritius, did much irreparable harm at a very early stage. In consequence, yields were extremely poor, being as follows in kilos per arpent—

Avoyelle	57·0
Charlie	48·5
Java Forage	47·9
Nigra	43·6
Nanda	37·4
Brunea	27·2
Bico'or	23·8
Biloxi	9·2

(ii) For satisfactory growth soya seeds must be inoculated with the appropriate strain of root nodule bacteria. A proprietary preparation, known on the maket as " nitragin," provides the necessary inoculant. Some nitragin was received in July and, although the planting season was past, a small trial was laid down. The treated seed produced healthier and greener plants,

with abundant nodule formation. In view, however, of the lateness of the season, yields were very low. They are nevertheless given below, in kilos per arpent, as the difference between treated and non-treated seed is striking.

	Treated	*Control*		*Treated*	*Control*
Nigra	132·6	37·9	White	56·8	37·9
Brunea	113·7	56·8	Roanoke ...	37·9	16·3
Charlie	113·7	19·7	Java Forage ...	37·8	16·2
Avoyelle ...	94·0	16·2	Bicolor ...	18·9	16·2
Nanda	75·8	35·6	Unknown ...	75·8	18·9

(iii) The following varieties of soya were introduced from Java in the hope of finding one or more strains suitable for average Mauritian day-length. They were multiplied at Pamplemousses, at least those which did not refuse to grow. In some cases, only a single plant was saved. One or two of these bore abundant pods. Biloxi 1 and 2, Misc. 28, E.B. No. 3910, Bilofield No. 1, Kedele 449, 27, 16 and 29, Kedele Ringsit No. 1, Kedele Gondjah Slassavi.

(c) Groundnuts

(i) A variety trial was planted at Pamplemousses in December 1947, and harvested in April 1948. The local variety " Cabri" was again outstanding. San Jose No. 1 was a close second. The incidence of wilt disease in this trial was registered and is given below together with the yields obtained—

Yield in kilos per arpent	*Cabri*	*San Jose I*	*Buit*	*Virginia Bunch*	*Vigan Lupog*	*Tennessee*	*Valencia*
Green nuts ...	2,683	2,734	2,646	2,518	2,495	2,302	2,445
Air-dried nuts ...	1,384	1,363	1,341	1,295	1,276	1,254	1,233
	%	%	%	%	%	%	%
Wilt	4·2	7·5	7·5	9·1	11·7	8·3	5·8

(ii) It will be recalled that 200 tons of unshelled groundnuts for seed were introduced from Uganda late in 1946 in the drive for an increased local production of edible oil. This seed proved exceptionally susceptible to wilt disease. A comparative yield trial, with " Cabri " as the control variety, suffered severely and it was decided to replant the same land in the cool season for further observations. It was found that while the " Cabri " variety contracted the disease to the extent of 9·7 per cent of the plants in the trial, the variety from Uganda registered 73·1 per cent diseased plants.

(iii) Fourteen new varieties of groundnuts were received from Africa in sufficient quantities to be included in a small trial which will be harvested in 1949. Variety *Grocind*, of which a few seeds were received from Amani in 1946, has now been sufficiently multiplied for inclusion in a trial next year.

(d) Yams

Once in a while someone in Mauritius inquiries about yams. Yet a few square feet of well-manured land would provide a family with a considerable quantity of this valuable food crop. Collections of varieties are carried over from year to year in the hope that more interest will be aroused one day in

the cultivation of this attractive and prolific food crop. Yams do particularly well at Pamplemousses where a randomised variety trial was planted in November 1947 and harvested in July 1948, with the following results—

	Yield in tons per arpent		
	Gross Weight	*Weight of seed*	*Net Weight*
Hendeni I	17·8	2·5	15·3
Hendeni IV	11·6	0·9	10·7
Kahata Kondol	12·8	3·1	9·7
Light Red	11·0	2·5	8·5
Scaled top	9·1	1·6	7·5
Cush	8·9	1·9	7·0
Oriental	8·4	1·6	6·8
Bottle neck Lisbon ...	9·0	2·2	6·8
Lisbon	8·3	1·6	6·7
Danish	6·4	1·6	4·8

The tastiest of these varieties are Oriental, Cush, Danish and Light Red.

(e) Tomato

The Marglobe variety continues supreme. Sown end of March and transplanted on 6th April, it gave a yield of 6 tons of fruit per arpent, very few plants suffering from wilt. The " local " tomato, planted out at about the same time, yielded 1,750 kilos of fruit.

Five varieties were received from Hawaii, namely: *Bounty, Hawaii, Pearl Harbour,* Nos 3205 and 3167. As compared with Marglobe they all proved rather early and yielded poorly.

(f) Dholl Kessari

This useful pulse is grown to some extent by small planters in the winter. Hitherto ideas as to yields were rather vague and a few observation plots were planted. Water was applied when necessary. Yields were as follows—

Station and altitude	*Date of sowing*	*Date of harvest*	*Yield in kilos of air-dried pulse per arpent*
Barkly (750 ft.) ...	5.6.48	29.10.48	308
Pamplemousses (180 ft.)	14.5.48	Sept./Oct.	242
Reduit (1,000 ft.) ...	18.5.48	28.10.48	181

(g) Lentils

Under normal pre-war circumstances, Mauritius imports of lentils exceeded those of any other pulse except dholl. For a number of reasons: depredations by birds, wilt disease, etc., lentils are not usually grown in the island, but trials have been carried out by various individuals in the past. This year, both the large and small-seeded types yielded poorly at Pamplemousses, while at Réduit, a yield of 103 kilos per arpent was obtained from the large-seeded lentil. The crop suffered from wilt disease and nematodes.

(h) Coriander

Sown at Pamplemousses in drills 18 inches apart on 14th May, Coriander gave a yield of 392 kilos per arpent. In 1947 and 1946, in drills 24 inches apart, sown early in June and July respectively, the yields were 280 and 300 kilos per arpent. This plant is free from pests and diseases. Coriander is used chiefly by the Indian population and a fair quantity is imported annually although there is no doubt that the island should produce all it requires at remunerative prices to the grower.

(i) Linseed

Small plots of three varieties: *Punjab. Rio* and *Royal* were planted at Réduit for observation purposes. The yields obtained were 387, 400 and 110 kilos per arpent respectively of the air-dried seed, as compared with 85, 241 and 233 kilos in 1947. In 1947, sowing had been done late—in August—whereas in 1948 the seeds were sown on 16th June. Water was supplied as required.

(j) Cluster Bean

Introduced since 1945 from Trinidad, Cluster bean is not happy at Pamplemousses where it yielded very poorly and was attacked by the flea beetle.

(k) Derris

At a planting rate of 7,000 plants per arpent, the rate of fresh roots obtained at Réduit after three years was 3 tons.

(l) Pyrethrum

A sample of seed was received from St. Helena at the end of 1946. Plants raised from seed received from East Africa many years ago had never flowered. The seeds were sown on 3rd January, 1947, and the 47 seedlings obtained were transplanted out on 31st March. In November and December, 29 of the clusters formed flowered producing 521 flowers which, after drying in the sun, weighed 100 grams. Some seeds were obtained from these flowers and were kept for sowing later. Of the original 47 clusters, 19 were still alive at the end of 1948 when 11 of them produced flowers. From the seeds raised locally, 53 seedlings were obtained in April, 1948. These plants had developed well by September and in November/December seven of them flowered. The flowers, in both years, were small.

5. Production of Vegetable Seeds

It was reported in 1945 that in view of the resumption of the importation of vegetable seeds by various merchants, the scale of production of such seeds undertaken by the Agricultural Division had been curtailed. Certain of these seeds ceased to be produced altogether. However, the good name which our seeds have already earned among market gardeners as well as amateurs called for a review of this policy and a certain extension of previous activities was considered desirable this year when planning out the planting programme.

The season was generally favourable and no particular trouble was experienced from pests and diseases. Most of the seeds were produced at Barkly and Réduit, but a small quantity was raised at Pamplemousses which is convenient for isolation purposes.

The following table gives the quantities of seeds produced since 1945.

Type	*1945 kilos*	*1946 kilos*	*1947 kilos*	*1948 kilos*
Beans—Total	350·00	230·50	306·40	381·20
Victory	—	—	176·50	220·30
Golden Queen ...	—	—	72·10	64·90
Long Tom	—	—	14·30	23·10
Prolific Long-podded	—	—	23·80	29·40
Canadian Wonder ...	—	—	18·70	43·50
Bean, Broad "Bocla" ...	—	—	1·00	5·30
Butter	—	2·7	—	—
Winged	6·0	3·0	—	—
Beet-root	1·5	2·5	·50	·50
Bitter gourd—Chinese... ...	—	—	·14	—
Brède de Chine—Blanc ...	·50	·70	7·10	6·01
Bouquet ...	·50	·70	5·80	26·20
Brinjal—Rosita...	3·0	2·8	1·73	1·74
Capsicum—Total	—	—	2·10	·47
Chinese Giant ...	4·8	1·1	·62	·36
Neapolitan ...	4·8	1·1	·83	·11
Maul's Red Hot ...	4·8	1·1	·65	—
Carrot	2·60	1·20	·50	2·40
Cauliflower	5·00	5·00	6·50	7·00
Cowpeas	3·00	15·40	12·80	16·50
Leek	·10	—	—	1·20
Lettuce—Total	8·00	8·7	5·82	3·82
"Blonde d'été" ...	—	—	1·81	2·10
Iceberg	—	—	—	·52
Mignonette	—	—	2·00	·49
Sucrine	—	—	·34	·11
Webb's Wonderful...	—	—	1·17	·60
Peas—Total	325·00	68·60	119·12	200·10
Black-eyed Susan ...	—	—	22·00	36·70
Greenfeast	—	—	89·30	154·70
Local	—	—	6·10	8·70
Petsai Distin's type	4·50	—	1·72	10·62
Radish	1·00	—	—	1·83
Rave	—	20·00	—	43·50
Salsify	7·00	5·00	5·00	10·30
Solanum nigrum–Brède Martin	—	1·00	—	·52
Tomato—Total	2·90	1·20	·68	1·38
Bounty	—	—	·04	—
Hawaii	—	—	·06	—
Marglobe	—	—	·56	1·38
Pearl Harbour ...	—	—	·02	—

Seeds of carrots (acclimatized "Chantenay") will be released in 1949. Work has proceeded since 1943 on the improvement of this variety and a stage has now been reached when locally produced seeds of this vegetable

can easily compete with imported seeds. The local type has the additional advantage of being definitely more resistant to blight disease than most imported varieties.

Of the seeds listed above the only one which will not be released for some time to come is beet-root. Beet-root does not easily set seed in Mauritius owing to the day length. In 1945, a plant was discovered in flower in a hidden corner of the Beau-Bassin Allotments. The root, however, was inferior, small, with a tendency to branch and with an unusually large crown. Rigid selection was effected and several strains have been obtained. Generally, the type is quick-maturing and, unless the land is reasonably fertile and well-supplied with manure before planting, the roots tend to remain small. With proper handling, the local variety, when released, should prove most acceptable to vegetable growers.

6. Plant Propagation

The propagation of plants of various kinds, both economic and ornamental, continued during the year as in the past, this Division being the only permanent organisation in the Island for this kind of work. The number of plants raised was increased to meet a greater demand from the public. This work was carried out at Pamplemousses and Barkly.

Various methods of propagating some of the principal tropical fruit trees, under conditions prevailing in Mauritius, have been tried in recent years and the most successful method for each species has been adopted as the standard practice. For the *avocado-pear*, side-grafting—although the scion remains a long time dormant—has given the best results. The *litchi* continues to be propagated by layering. The *peach* responds easily to crown-grafting particularly if this is done on stocks not much older than six months. The *mango* continues to prove as difficult as it did over a hundred years ago. The method which gives most success at present is the well-known in-arching, but this is slow and results in a heavy demand for labour before the grafts are ready. In the past four years efforts have been made by Mr. J. H. Julien, Agricultural Officer, to investigate the value of any proven grafting methods but without conspicious or indeed sufficient success. Further trials have been made this year and three methods were tested on a considerable scale. This work was performed at Pamplemousses and Abercrombie where the temperature is higher than at Barkly. Moreover, in order to begin work as early as possible in the summer and to appraise roughly the influence of a temperature somewhat higher than air temperature, half the plants grafted were placed under a glass-covered shelter while the other half remained in the open.

The methods tried were—

(a) Side-graft on wood of different ages ;

(b) side-tongue graft ; and

(c) patch-budding in the same way as young rubber seedlings are patch-budded. It is as yet too early to report results, much of this grafting having been done in the closing month of the year, but patch-budding appears to hold out distinct promise of success.

With ornamentals, cuttings of *Bougainvilleas*, are usually difficult to strike. As there is always a fair demand for these beautiful plants, attempts have been made to obtain a higher percentage of strikes. All have failed. This year, the effect of treatment with hortomone A has been tried but only one variety—Mrs. Butt—has responded a little, as results tabulated below show—

Variety	*Date planted*	*Treated (T) Not-treated (N)*	*Number of cuttings*	*Number of strikes*
Rose	30.4.48	N	70	1
	,,	T	70	0
Brick	,,	N	125	3
	,,	T	125	0
Louis Wathen ...	26.4.48	N	70	1
	,,	T	70	7
Mrs. Butt	,,	N	70	0
	,,	T	70	20
Mrs. Butt	25.5.48	N	70	3
	,,	T	70	21

Progress in our nursery work is reflected to some extent by the number of the principal fruit trees sold annually over a period of years. Data have been kept since 1945—

	1945	*1946*	*1947*	*1948*
Avocado seedlings	114	123	227	144
Citrus seedlings...	223	362	1,930	2,316
Guava seedlings...	27	330	373	152
Guava root cuttings	—	-	—	4
Litchi layers	183	650	680	990
Mango seedlings	—	—	—	21
Mango grafts	111	367	368	514
Peach seedlings	—	—	—	52
Peach grafts	1	7	207	278
TOTAL	659	1,839	3,785	4,471

7. Revenue

The same policy has been followed as in the past, namely, to place at the public's disposal a diversity of useful plants at such prices as will encourage even the poorest to buy. Last year's record figure has been exceeded:

	1946	*1947*	*1948*	*Previous highest*
	Rs.	*Rs.*	*Rs.*	
Barkly Nursery...	1,827	2,780	3,179	1947
Abercrombie Nursery	2,149	3,076	3,803	1947
Free to Government Institutions ...	647	526	394	1946
TOTAL ...	4,623	6,382	7,376	

The sale of vegetable seeds brought in Rs. 2,470 as compared with Rs. 1,081 in 1947 and Rs. 2,312 in 1946. In addition, seeds to the value of Rs. 644 were supplied free to Government Intitutions.

The total potential revenue from the disposal of plants and seeds thus came to Rs. 10,490.

8. Plant Introduction

Among the more interesting introductions during the year, the following may be mentioned—

Paspalum notatum, from Nyasaland, a useful soil cover and fodder, resistant to dry conditions and a useful stop-wash plant in soil erosion control.

Aleurites Montana, a selected strain of Tung plant from Nyasaland.

Arachis hypogea, 14 varieties of groundnuts from Africa.

Pueraria phaseoloides, Tropical Kudzu, a useful cover crop and fodder.

"Pelican Processor," a high starch variety of sweet potato, from Maryland, U.S.A., of especial interest for Rodrigues.

Chloris gayana, a highly drought resistant variety of Rhodes grass, from Uganda.

Seven varieties of soya bean, from U.S.A., and eleven from Java.

A collection of ornamental and other seeds from Brazil, including *Tecoma Flazimii, Acacia imperialis, Hovenia dulcis, etc. Erythrina Crista-Galli,* from Palestine.

9. Barkly Experimental Station

The new plant shed, covering an area of 7,500 square feet and constructed to resist the most violent cyclones, was completed. It accommodates all plants potted for sale. A similar structure, but of smaller dimensions, was erected for the propagation of certain plants by cuttings. A special potting shed, also cyclone-proof, was built close to the solar propagators.

Permanent fencing was erected around Plots I—V and part of Plot XIV.

The young orchard of guavas and peaches bore some fruit this year for the first time. The litchi and avocado plots have made satisfactory progress.

10. Royal Botanical Gardens, Pamplemousses

Most of the many young plants set out in the course of the last three years have grown satisfactorily. Considerable trouble has again been taken to reduce as much as possible the damaging root competition from grass and established neighbouring trees by opening a circular ditch around the young plants and refilling it afterwards, often after the addition of some pen manure.

The edges of the lake, which had suffered much disintegration from wave action, were lined with cut stones ; this and the plantation of the beautiful palm. *Ptychosperma Mac Arthurii,* on the banks, have done much to enhance the beauty of that part of the Gardens.

11. Telfair Gardens, Souillac

This small garden commands a beautiful view across the entrance to Souillac cove and is a favourite spot for picnics and bathing. It is unfortunately exposed to sea breezes and it is difficult to grow anything satisfactorily except filao. It suffered so disastrously from the 1945 cyclones that it has not yet recovered.

12. Visits to Small Planters

As in the past, but on a somewhat smaller scale owing to shortage of staff, visits were paid to planters of vegetables and food crops. Six demonstration plots were laid out in which vegetables raised from seeds produced by the Division were grown. It is proposed to establish more of such plots in the coming year.

13. Allotments

Considerable progress has been made, especially at Curepipe and Beau Bassin, in the protection of plots from erosion—at the cost of much persevering effort from the supervising staff. Most of the allottees have secured employment elsewhere, either temporary or permanent, but mostly permanent, and many tend, as a result, to neglect their land. Those who strive to make a living on their allotments have generally met with success especially at Moona where water for irrigation is available and where each plot is two acres in area as compared with one acre at Curepipe and at Beau Bassin.

There were, during the year, 197 allottees occupying an area of 215 acres with 137 huts. Five of them were evicted and replaced by applicants on the waiting list. The number of farm animals has increased slightly, especially poultry and rabbits.

14. Higher Agricultural Education

Courses of lectures in agricultural subjects were delivered to students of the College of Agriculture. Practical classes were held as in previous years.

15. Herbe Condé

" Herbe Condé," the enemy of aloe plantations and invader of roadsides, waste places, orchards and pastures had, in the past, given trouble at the Royal Botanical Gardens where clusters of the weed tend to grow at the foot of every tree from seeds dropped by birds. For the last three years, systematic eradication of *Condé* plants when still young and before seeds are formed has been the rule at the Gardens. As a result of this practice, the Gardens have been kept remarkly free from this weed. In view of the fact that extensive areas of grass lands, especially on the coastal *pas géométriques* have been invaded and the number of cattle has been greatly reduced in consequence, an idea of the cost of keeping the weed down should prove of interest to cattle owners. Conditions at the Royal Botanical Gardens in many respects resemble those prevailing on the coastal pasture belt where eradication by hand is comparatively easier owing to the sandy nature of the soil. The

area involved at the Gardens totals 67 acres of which a part is subject to regular cutting with scythes—a fact which, of course, reduces the cost of weeding. The area weeded monthly and the labour employed is tabulated below—

Month	*Area weeded (sq. ft.)*	*Men*	*Women*	*Boys*
January	Nil	—	—	—
February	Nil	—	—	—
March	89,500	9	2	5
April	152,500	16	6	1
May	105,500	13	2	—
June	249,000	9	2	—
July	72,000	3	—	—
August	Nil	—	—	—
September	155,000	12	—	
October	Nil	—	—	—
November	126,000	3	—	—
December	248,000	6	10	—
TOTAL	... 1,197,500 or 27·5 acres	71	22	6

For 27·5 acres the cost was Rs. 239.06 or Rs. 8.70 per acre actually weeded. Taking the whole garden area into account, the cost works out at Rs. 3.57 per acre, per year

16. Acknowledgment

In concluding this report I wish to place on record my appreciation of the assistance received from all members of my staff during the year. My thanks are also due to those members of the public who have kindly sent us seeds and plants.

G. A. NORTH COOMBES,
Senior Agricultural Officer.

Appendix 5

Sugar Technological Division

1. Visits to Factories

Thirty factories and ten distilleries were visited by the Sugar Technologist and his Assistant.

Advice was given when sought for and routine analytical work carried out for the factories and distilleries.

2. Insvestigations

In one factory, at the request of the Manager, all the processes in use were investigated. Seeding the strike with powdered sugar and electrical conductivity control of grain formation were instituted in that factory. Recommendations were also made for further improvement of methods which it was not possible to effect immediately.

At a second factory where an important amount of extra-fuel was being consumed annually a full inquiry was made into the heat balance. The manager was presented with suggestions which, put into operations, resulted in a considerable reduction in extra-fuel consumption.

Oliver Campbell filters having been installed in two factories and in view of reports from abroad to the effect that the sugar extracted by these filters over that extracted in filter presses was not recoverable, experiments were carried out in order to ascertain what was under our conditions the optimum value of sucrose per cent in cake.

Forty determinations were made at the Mount Sugar Factory in collaboration with Mr. F. Smith, the Chief Chemist of the factory. Each determination was done on samples composited during about 12 hours. The results are tabulated below—

No. of determinations	*Average purity of clear juice from filter*	*Average purity of clarified juice from clarifier*	*Average Sucrose % cake*
8	67·4	87·4	0·9
27	79·5	85·1	1·5
7	81·8	87·8	3·0

From the above, it appears that it is not desirable to exhaust filter cake beyond 1·5 per cent sucrose. The difference in purity between clarified juice and filter press juice is 2 to 5 degrees according to amount of wash water used.

3. Factory Tests of new Cane Varieties

The three varieties M.165/38, M.63/39 and M.76/39 were further tested this crop. A total of 127 tests were performed in collaboration with estate chemists. The annexed tables show the results obtained. Tables I–III establish a comparison between each variety and M.134/32 ; Tables IV–VI are figures from all the tests—including those where a standard of comparison could not be obtained.

It appears from the tables that these cane varieties are fairly good and that their cultivation would have been very attractive in the absence of a " wonder cane " as M.134/32. From the standpoint of economy, the best seems to be M.76/39, next comes M.165/38 and last M.63/39. A complete costs analysis has shown that M.76/39 would even yield more profits per arpent than M.134/32 on the average. However, it presents, in some cases, large variations from average characteristics and this renders it less reliable than the latter cane.

4. Cost of Production of Alcohol

At the request of the Mauritius Economic Commission an inquiry was made by this Division into the costs of production of alcohol for the years 1942 and 1946.

Table VII of this report gives average figures for the distilleries operating during those two years.

It wil be noted that the heaviest expenditures are incurred under the items molasses and fuel. In some cases distillers were advised how to reduce the costs under these items. Amongst other things, the process of " Reprise des Levures " was recommended.

5. Control of Alcohol Intended for Export

This was instituted as from the month of August 1948 and the following specifications laid down for alcohol to be exported.

	Grade A	*Grade B*
°Gay-Lussac	>94°	>94°
Barbet Test	> 3 minutes	>30 seconds
Acidity expressed as acetic acid per litre	<10 mgs.	<10 mgs.
Mineral acidity in terms of sulphuric acid per litre	< 2 mgs.	< 2 mgs.
Dry matter per litre ...	< 5 mgs.	< 5 mgs.

Also, the alcohol should remain limpid when diluted with an equal volume of water (for both grades).

Up to now, more than three million litres of spirits have been shipped after analysis according to the new scheme. Quality which was far from being satisfactory at the start, has by now considerably improved and it is hoped that in the near future it will be possible to export only alcohol complying with the specifications of the present Grade A.

6. Utilisation of Distillery Residues

The yeast factory under the control of this division continues to operate, receiving its raw material from the distilleries. During the year under review, 2,477,500 yeast tablets for human consumption and 19,913 kgs. of yeast-bran mixture for animal feeding have been produced.

7. Milling Tests

Five complete milling tests were performed during the crop at the request of the factory managers—results are published in Table VIII.

In the light of the results obtained, suggestions were made for the alteration of settings and, or the improvement of plant. In one case (No. 4), it was found that the application of pre-calculated settings had proved excellent in spite of an exaggerately low dilution.

8. Factory Data

Final figures have been received from the thirty factories that operated during last crop.

The final results for the last five crops are compared in Table IX.

9. Miscellaneous

The Sugar Technologist has examined a number of claims for Letters Patent from local and foreign inventors.

Amongst these the most interesting was Humbert's decorticating machine. The patent has been granted and the inventor approached by this Department, which has been allowed the construction of a decorticator. This is in course of erection at the departmental workshop and will shortly be operating. There is a wide field for research in the fibre industry which is at present in a period of rapid development.

S. Staub,
Sugar Technologist.

TABLE I.

Variety M. 165/38

Date	Factory	Place of growth	Category and Age	Yield canes T/A	1st expressed Juice		Fibre %	Richesse	C. C. S.	
					Purity	Glucose Ratio			% cane	T/A
29. 7.48	Queen Victoria	Queen Victoria	V. 17m.	70	83·1	8·2	11·5	10·79	8·80	6·16
21. 7.48	Constance	Belle Vue	V. 13m.	54·9	84·1	—	12·8	12·13	10·09	5·54
28. 7.48	Beau Vallon	Terres Franches	V. 14m.	35	86·7	—	12·0	13·07	11·22	3·93
25. 7.48	Labourdonnais	Labourdonnais	V. 14m.	42·1	87·1	—	12·6	14·43	12·32	4·94
6. 8.48 9. 9.48 7.10.48 30.10.48	Medine*	La Mecque	V. from 16–18 m.	64·8	87·4	5·3	12.2	13·73	12·02	7·79
Mean figures M.165/38				53·4	85·5	—	12·2	12·83	10·89	5·82
Mean figures M.134/32				43·6	89·8	—	12·1	14·41	12·67	5·52

*Means of 4 analyses.

V. = Virgins.
M. = Months.

TABLE II

VARIETY M. 63/39

Date	*Factory*	*Place of growth*	*Category and Age*	*Yield canes T/A*	*1st Expressed Juice*		*Fibre %*	*Richesse*	*C. C. S.*	
					Purity	*Glucose ratio*			*% cane*	*T/A*
2. 7.48	Britannia	Britannia	V. 16m.	61·3	83·6	—	11·4	11·40	9·45	5·79
29. 7.48	Queen Victoria	Queen	V. 17m.	62	81·2	8·2	8·3	10·35	8·46	5·25
14. 7.48	Constance	Belle Vue A	V. 13m.	52·8	83·6	—	10·1	11·69	9·81	5·18
19. 7.48	Mon Desert	Beau Bois	V. 20m.	35·0	86·9	—	13·6	12·31	10·45	3·66
28. 7.48	Beau Vallon	Terres Franches	V. 14m.	35·0	86·5	—	11·5	12·56	10·78	3·77
10. 9.48	Savinia	Gros Bois	V. 21m.	35	86·3	—	11·4	12·07	10·27	3·60
5. 8.48 and 25. 9.48	Labourdonnais	Labourdonnais	V. 12½ and 14m	26·6	86·6	—	11·8	13·12	11·17	2·97
6. 8.48 9. 9.48 7.10.48 30.10.48	Medine	La Mecque	V. from 16–18m.	50·1	86·1	5·6	12·6	12·24	10·34	5·18
	Mean figures M. 63/39			44·7	85·1	—	11·3	11·97	10·09	4·51
	Mean figures M. 134/32			40·1	89·7	—	11·6	13·81	12·13	4·86

TABLE III

Variety M. 76/39

Date	Factory	Place of Growth	Category and Age	Yield canes T/A	1st expressed Juice		Fibre %	Richesse	C.C.S.	
					Purity	Glucose ratio			% cane	T/A
27. 7.48	Britannia	Britannia	V. 16 m.	61·3	83·6	—	11·4	11·40	9·45	5·79
29. 7.48	Queen Victoria	La Gaiété	V. 17 m.	60	81·1	7·4	12·2	11·23	9·01	5·41
19. 8.48	Mon Désert	Beau Bois	V. 20 m.	38·0	87·8	—	12·8	12·42	10·58	4·02
21. 8.48	Constance	Belle Vue A.	V. 13 m.	57·8	82·8	—	12·8	11·80	9·68	5·60
10. 9.48	Savinia	Gros Bois	V. 21 m.	38	89·4	—	11·9	13·67	11·95	4·54
25. 9.48	Labourdonnais	Labourdonnais	V. 14 m.	38·2	87·1	—	12·8	14·83	12·66	4·83
6. 8.48 9. 9.48 7.10.48 30.10.48	Médine	La Mecque	V. 16–18 m.	51·0	89·1	3·6	11·8	14·49	12·65	6·43
	Mean figures M. 76/39			49·2	85·8	—	12·2	12·83	10·85	5·34
	Mean figures M. 134/32			40·7	89·8	—	11·6	13·80	12·13	4·95

TABLE IV

Factory Tests on M.65/38

Districts	*No. of tests*	*Purity 1st Expressed juice*	*Fibre % cane*	*Richesse*	*C.C.S. % cane*
Pamplemousses and Riv. du Rempart ...	1	87·1	12·6	14·43	12·32
Flacq	5	84·9	12·0	11·82	9·89
Moka and Plaines Wilhems	3	79·7	12·2	11·06	8·86
Black River	10	88·9	12·1	14·20	12·48
Grand Port	2	87·0	12·3	13·74	11·83
Savanne	4	83·5	11·2	11·92	9·88
Mean for the Island	25	85·2	12·1	12·86	10·88

TABLE V

Factory Tests on M, 63/39

District	*No. of tests*	*Purity 1st Expressed juice*	*Fibre % cane*	*Richesse*	*C.C.S. % cane*
Pamplemousses and Riv. du Rempart ...	4	86·6	12·1	13·46	11·44
Flacq	4	84·8	11·1	11·93	10·01
Moka and Plaines Wilhems	23	87·4	12·0	12·42	10·66
Black River	28	86·0	12·6	13·04	10·98
Grand Port	6	85·5	11·4	12·74	10·80
Savanne	6	86·1	11·4	12·61	10·25
Mean for the Island	71	86·1	11·8	12·70	10·69

TABLE VI

Factory Tests on M. 76/39

District	*No. of tests*	*Purity 1st Expressed juice*	*Fibre % cane*	*Richesse*	*C.C.S. % cane*
Pamplemousses and Riv. du Rempart ...	3	87·9	12·6	15·07	12·93
Flacq	5	85·2	12·4	12·66	10·47
Moka and Plaines Wilhems	5	87·8	11·2	13·62	11·72
Black River	9	88·3	12·5	14·22	12·26
Grand Port	4	88·0	12·0	14·45	12·46
Savanne	5	83·9	11·5	12·30	10·23
Mean for the Island	31	86·9	12·0	13·72	11·68

TABLE VII

Cost of Production and Nett Profit

(per 100 litres of spirit at 94° G.L.)

Power Alcohol	*1942*	*1946*		*1942*	*1946*
To Manufacturing expenses ...	17·51	21·64	By Selling Price	36·71	40·32
Denat : Agents ...	5·00	5·38			
Excise Duties ...	8·00	8·00			
Nett cost of production ...	30·51	35·02			
Balance being : *Nett Profit* ...	6·20	5·30			
	36·71	40·32		36·71	40·32

Exported Spirits	*1942*	*1946*		*1942*	*1946*
To Manufacturing expenses ...	17·51	21·64	By Selling Price	27·91	34·98
Balance being : *Nett Profit* ...	10·40	13·34			
	27·91	34·98		27·91	34·98

Analysis of Manufacturing Expenses

	1942	*1946*
Molasses	6·70	8·90
Fuel	5·02	5·02
Salaries and Wages	2·45	3·24
Maintenance and Repairs ...	1·56	1·82
Miscellaneous and Incidentals ...	1·31	0·99
Overhead charges	0·75	0·75
Depreciation on Plant	0·85	0·92
Cost of Production Naked ...	17·51	21·64

TABLE VIIA

Manufacturing Expenses

(extreme figures)

	Highest		*Lowest*	
	1942	*1946*	*1942*	*1946*
Molasses	8·89	13·19	4·20	4·58
Fuel	5·66	7·55	3·50	3·00
Salaries and Wages	3·88	5·37	1·13	1·84
Maintenance and Repairs ...	3·84	4·40	0·44	0·61
Miscellaneous and Incidentals ...	2·35	2·10	0·60	0·31
Overhead charges	1·73	1·95	0·50	0·50
Depreciation of Plant	1·54	1·55	0·56	0·40
Cost of Production Naked ...	22·44	25·96	15·99	15·55

TABLE VIII

Results of Milling Tests

Factory No.	Date of Test	Milling Plant and Capacity (T.C.H.)	Sucrose % cane	Fibre % cane	Dilution % Absolute Juice extracted	Unit	Juice extracted by front pressure % Total juice extracted by unit	Sucrose extracted: By unit: % Sucrose entering unit	Sucrose extracted: By unit: % Sucrose in cane	Sucrose extracted: By unit: % Total Sucrose extracted	Sucrose extracted: By unit and preceding units % sucrose in cane
1	3rd August	RK + 3M I 32″×66″ II and III 30″×66″ 40 T.C.H.	13·56	13·7	27·8	Mill No. I	—	69·4	69·4	76·9	69·4
						,, II	—	34·3	10·5	11·6	79·9
						,, III	—	51·8	10·4	11·5	90·3
2	4th August	2RK + Cr 32″×66″ (F) + 3M 32″×66″ 55 T.C.H.	13·04	10·8	18·5	Crusher	—	56·6	56·6	59·4	56·6
						Mill No. I	66·1	84·7	36·8	38·6	93·4
						,, II	80·3				
						,, III	—	28·8	1·9	2·0	95·3
3	31st August	RK +4M 30″×66″ Hydraulic pressure on IV odly. 44 T.C.H.	12·90	10·9	24·1	Mill No. I	—	61·2	61·2	64·2	61·2
						,, II	75·7	53·2	20·6	21·6	81·8
						,, III	24·5	48·4	8·8	9·3	90·6
						,, IV	59·7	40·6	4·7	4·9	95·3
4	30th September...	2RK + Cr 33½″×72″ (F) +4M 32″×72″ 75 T.C.H.	14·51	10·4	6·0	Crusher	—	67·2	67·2	71·9	67·2
						Mill No. I	20·9	34·6	11·3	12·1	78·5
						,, II	28·9	34·4	7·4	7·9	85·9
						,, III	26·6	31·6	4·5	4·8	90·4
						,, IV	8·8	32·1	3·1	3·3	93·5
5	23rd November...	RK+4M I and IV 30″×66″ II 29″×63″ III 29″×66″ 40 T.C.H.	14·99	10·8	36.1	Mill No. I	—	71·3	71·3	74·5	71·3
						,, II	—				
						,, III	74·5	52·5	15·1	15·8	86·4
						,, IV	82·2	68·2	9·3	9·7	95·7

TABLE IX

AVERAGE CROP RESULTS 1944—48.

Year	*Sucrose % Cane*	*Fibre % Cane*	*Mill Extraction*	*Sucrose in Sugar% cane*	*Reduced Boiling House Recovery*	*Boiling House Efficiency*	*No. of crushing hours per day*	*Remarks*
1944 ...	13·40	13·05	94·9	11·20	87·8	95·2	12·2	—
1945 ...	13·42	13·86	94·6	10·97	87·3	98·1	13·1	Cyclone year
1946 ...	13·56	12·58	94·9	11·35	88·0	98·7	15·0	—
1947 ...	14·37	12·5	94·9	12·26	87·8	98·7	18·2	—
1948 ...	14·31	12·1	94·8	12·22	88·1	98·8	19·4	—

Appendix 6

Veterinary Division

A. Disease Control

1. FIELD OPERATION

Trypanosomiasis. The Island continues to be free from Trypanosomiasis as evidenced by the fact that the blood of about 3,000 animals was examined during the year with negative results. For that purpose, smears were taken from as many different centres as possible: on Estates and off Estates, in towns and villages, in one stable of the one-milch-cow man or the one-bullock-job-carter, in herds, from imported and local born draught animals.

Tuberculosis. The herds of the Government Breeding Centre at Palmar were tested during the year and out of 66 bovines none reacted.

Wire worms. 550 sheep and goats infected with these parasites were subjected to the N.C.A. treatment with full success.

Fowl Pox. The new vaccine prepared by South African Institutions was received during the year and applied in many flocks in the Island with encouraging results.

2. Research Operation

Abortion. Bang bacillus was isolated from the blood of the fœtus which had been sent to the Bacteriological Laboratory in December 1947. Consequently, during the year under review, the blood of all animals at the Government Dairy was subjected to the agglutination test and subsequently the test was extended to animals in various centres, results being as follows—

Months 1948	*Estate and District*	*No. of blood samples examined*	*Results of Agglutination tests*				*Remarks*
			No. of reactions at			*No. of negative reactions*	
			1/25	*1/50*	*1 in more than 100*		
January	Government Dairy, Curepipe (Plaines Wilhems) ...	74	19	18	13	24	Milch cattle
February	Government Stock Farm, Réduit (Moka)	6	1	2	—	3	,,
,, ...	Private Dairy (Moka)	25	5	4	1	15	,,
,, ...	,, (Plaines Wilhems)	6	1	1	—	4	,,
March	,, (Port Louis)	6	1	1	—	4	,,
,, ...	,, (Pamplemousses)	6	2	1	—	3	,,
April	,, ,, ...	24	2	2	—	20	,,
,, ...	,, (Grand Port)	6	4	2	—	—	,,
,, ...	,, (Savanne)	20	—	—	—	20	,,
March	Private herd (Rivière du Rempart)	6	—	—	—	6	Herd cattle
	Total ...	179	35	31	14	99	

At the request of the Veterinary Adviser to the Secretary of State, samples of blood were sent by air to London for further examination at Weybridge Laboratory where the agglutination test proved positive.

On the advice of the London Authorities, it has been decided to inoculate the calves of the Government Dairy with S.19 anti-contagious abortion vaccine and supply of that vaccine is expected to reach us by air.

B. Animal Husbandry

1. Field Operation

(a) Herd Animals. There appears to be some awakening of interest in draft animals and, late in the year, the Stock Breeders' Association have decided to make an attempt to import Brahman Cattle from U.S.A.

(b) Milch Animals. The response from milch-cow breeders, especially the one-cow man has not so far reach the expected extent in regard to the utilization of the bulls stationed for service at the various centres. The number of cows brought to them during the year was 1,050, the goal aimed being at 1,500.

2. Research Station

(a) Palmar Breeding Centre. It was decided in the later quarter of the year to reduce considerably the number of animals at this centre and 44 head were sold by auction in December 1948.

The present herd comprises: 18 africanders pure bred and crossed and 8 " local " animals.

(b) Artificial Insemination. Slow progress was made during the year, the main object having been to determine the maximum period during which fresh semen can be stored while keeping its potency and the optimum temperature of storage. Moreover, a young pure bred Friesland, born from artificial insemination, is being trained for the prompt collection of semen.

C. Improvement of Marketing of Animals and Animal Products

1. *Castration and Caponising.* 42 bulls, 35 rams, 67 goats were castrated and 45 cockrels were caponised on different estates as demonstration. One of the centres selected being the Ex-servicemen Farm at " Montebello," Sorèze.

2. *Slaughtering of milch animals.* 2,016 permits were issued for the slaughtering of discarded heifers and cows.

3. *Importation of animals—*

(*a*) For meat purposes—

From Madagascar	5,837 bullocks
Australia	11 ,,
,, ...	1,325 sheep
Rodrigues	3,168 goats
.. ..	306 discarded cows and oxen
.. ..	1,346 sheep
.. ..	1,819 pigs
Diégo Garcia	4 ,,
Péros Banhos	6 ,,
Salomon	16 ,,
St. Brandon	88 turtles

(*b*) For racing purposes—

From France	26 horses

(*c*) For riding purposes—

From Farquhar	1 poney
South Africa	1 horse

(*d*) For breeding purposes-

From England	1 dog
South Africa	6 dogs and bitches and 1 cat
India	2 dog and bitch
Egypt	1 bitch

(*e*) For draught purposes—

From Agalega	7 mules and 1 donkey
Diégo Garcia	6 horses, 2 ponies and 27 donkeys.

1. *Exportation of animals*:

To Farquhar	1 mare
Hong Kong	2 dogs
Madagascar	17 fowls
	12 rabbits
Diégo Garcia	4 hares
	3 pigs
Agalega	4 heifers.

5. *Abattoir Visits.* Abattoirs of the island were occasionally visited by the Veterinary Officer and the Assistant Veterinary Officer. No seizure to report.

D. Veterinary Education

Students of the first, second and third year received lectures at the Agricultural College on the Animal Husbandry, Anatomy, Physiology of farm animals and Veterinary Pathology by the Veterinary Officer and by the Assistant Veterinary Officer.

Quarantine

1. *Réduit Kennels.* The following animals were imported during the year and placed in quarantine for 6 months—

1 bitch and 3 pups wire haired terrier.
1 bitch and 2 dogs Cocker spaniel.

The 7 above animals have been delivered to their owner in good condition of health after having undergone the 6 mouths quarantine, and the following are still undergoing the quarantine at the end of the year:

1 dog great Dane.
2 puppies great Dane.
1 dog Dachshound.
1 cat Angora.

Note. 1 bitch Delmatian died from pneumonia 48 days after its arrival.

2. *Fort William Quarantine Station.* 443 sheep for mutton arrived from Australia and were placed on observation for some days.

4 milch heifers were also placed on observation for 20 days and then shipped to Agaléga for breeding purposes.

Staff

Mr. J. G. S. Bennie, newly appointed Animal Husbandry Officer, arrived in the Colony on the 22nd December, 1948, on secondment.

Mr. Y. Lefebure, the Assistant Veterinary Officer, was on leave for three months from August to October 1948.

F. E. Lionnet,
Veterinary Officer.

Appendix 7

Government Dairy

Yield of Milk

	litres
Supplied to customers (Hospitals and Child Welfare) ...	81,777
Fed to calves	8,083
Samples for control	24
TOTAL ...	89,884

Births

Thirty calves were born during the year: 16 males and 14 females.

Sales

Four calves were sold to breeders: 3 males and 1 female. In addition, 16 cows were sold to butchers by tender, two of them had been accidentally injured and the others were either passed the stage of economic production or were unproductive.

Deaths

Six animals died during the year: 5 calves (3 males and 2 females) and an old bull.

Abortion

Two cases were recorded during the year.

Tuberculosis

No tuberculin test was performed during the year.

Y. LEFEBURE,
Officer-in-charge,
Government Dairy.

Appendix 8

Tea Division

The Tea Officer arrived at Port Louis on the 7th January, 1948, and took up his duties forthwith. The first three weeks were spent touring the areas suitable for growing tea, visiting the five black and one green tea factories and a number of tea plantations.

As a result of these visits and observations a report was submitted to Government early in February. The report was considered by the Executive Council at a meeting held on the 19th March, 1948, at which the Tea Officer was present. As a result of this meeting the Chamber of Agriculture met the owners of the factories situated in the Nouvelle France—La Flora—area with the object of exploring the possibilities of their amalgamating and building one new and up-to-date factory, to be run on co-operative lines. No agree

ment was reached at the meeting and the Tea Officer was then requested by the owners to visit their factories in order to draw up plans for their improvement and modernisation. This was done and plans submitted, but no decision has yet been reached and even if the suggested alterations are carried out, the result will be unsatisfactory and less efficient as compared to the suggested one new factory.

During April, Mr. H. G. Sandy, Commissioner of the International Tea Expansion Board in East Africa visited Mauritius. The object of his visit was to explore the possibilities of increasing internal consumption of tea in Mauritius. Mr. Sandy's report has been received. In this he outlines a scheme for a Tea Propaganda Campaign and the marketing of Mauritius teas.

During the month of October, the *Maisons Claires* Exhibition was held at Curepipe and at which the Department of Agriculture was invited to participate. The Tea Division displayed a model of a modern electrically lighted tea factory with all its necessary appurtenances.

Besides the factory, there was a quantity of display material to encourage the drinking of tea and a " Multipot " (thermo urn) from which free cups of tea, made from locally produced tea, were distributed.

For further expansion and improvement of tea production in Mauritius, tea seed will present one of its greatest difficulties. For a number of years, Government and private enterprise have been trying to obtain tea seed from other tea growing countries. Owing to the International Tea Agreement, the countries who subscribe to this agreement are not allowed to export tea seed to non-subscribing countries. A small quantity of seed from Malaya, a non-subscriber, was received in May this year. Unfortunately, germination was extremenly poor and the resulting plants obtained (approximately 9,799) will be distributed for use as tea seed bearers for the future.

An area of 5 arpents 40 perches in Crown Land Montille, on which tea was planted some 50 years ago and which for many years has been abandoned—the trees in many cases having obtained a height of 15 to 20 feet—has been cleared. Fertilizers have been applied and drains cut and I hope a fair quantity of seed will be obtained from here during the next few years. It is unfortunate that the history and origin of the original seed cannot be traced but from the appearance of the tea it is a good medium workable jat.

During March–April, 18,288 tea seeds were collected from this area, germinated and planted in nursery beds at the Sugarcane Research Station, at Côte d'Or. These plants grew extremely well and were ready for planting out in November–December. Of the Malayan seed, 9,799 seeds were germinated and these were also put in beds at Côte d'Or. These plants have not shown such vigorous growth as those from the local seed, due, in my opinion, to the Malayan seed not being fresh.

A Tea Bill has been framed to replace Ordinance No. 37 of 1943. This Bill, if it receives the assent of the Legislature, should go a long way towards putting the tea industry in Mauritius on its feet, as it incorporates clauses for

the control and marketing of Mauritius tea for export and local sale, a propaganda campaign to increase local consumption in addition to bringing up-to-date the present legislation dealing with the planting, producing and manufacture of tea in Mauritius.

During 1948, permits have been issued for planting 330 arpents of land in tea ; of this area, 20 arpents only have been cleared and planted, the chief reason being the lack of good seed or plants.

The amount of tea poduced in Mauritius continues to increase due mainly to the better methods of cultivation employed and that the tea planted just prior to 1943 is now coming into full bearing. Climatic conditions during 1948 were favourable. In addition to this, there are certain areas of abandoned or semi-abandoned tea of which some have been brought back into production. Production figures of manufactured tea for the last five calendar years are as follows—

Year	*Black tea*	*Green tea*
1944 ...	400,484 English pounds	—
1945 ...	383,036 ,, ,, (3 cyclones)	—
1946 ...	489,624 ,, ,,	—
1947 ...	544,959 ,, ,,	2,456 Eng. lbs
1948 ...	617,322 ,, ,,	2,454 Eng. lbs

Local consumption of tea for each year has previously been reckoned as production plus the amount of tea imported, no allowance being made for the carry over of stocks from one year to the next. I have been able during the last six months to collect some approximate figures of stocks and it would appear that production is now equal to consumption. Four of the months for which figures have been kept were off season months as regards crop and one would have expected stocks to decrease. This has not been the case, the total remaining about steady, so one can infer that during the period January to April, the heavy cropping months (cyclones excepted), stocks will increase.

If further areas are to be planted in tea, it is essential that an export market is obtained and the internal consumption of tea stepped up.

Were a propaganda campaign undertaken and " Multipots," the same as the one exhibited at the *Maisons Claires* Exhibition, made use of by estates, factories and those employing labour in any numbers, I am confident it will popularise tea as a beverage in place of rum and thereby be a benefiit both from the moral and health point of view. In addition to this, as more tea is required more land will be cleared and planted, thereby providing congenial work for labour.

The " Multipot " used at the Exhibition has been taken over by Government Sack Factory and is, I understand, a great success.

F. O. SPRINKS,
Tea Officer.

Appendix 9

Tobacco Research Station

In consequence of the reduced supply of irrigation water from La Ferme Reservoir combined with the slow preparation of the fields heavily infested with Chiendent (*Cynodon dactylon*, Pers.), the planting of the various tobacco experiments had to be spread throughout the year as a result of which the yield of the later planted trials was reduced considerably. The dry conditions which prevailed after the month of April caused severe wilting of the plants and considerable damage by leaf scorch.

Weather Conditions. The meteorological statistics for the year are as follows—

RAINFALL

Months	No. of rainy days		Inches	
	1948	Mean 1939–47	1948	Mean 1939–47
January	13	10·7	3·00	4·54
February	5	12·2	3·25	6·13
March	19	11·6	4·44	6·51
April	11	9·6	5·50	4·12
May	3	8·0	0·37	1·54
June	6	8·1	0·24	0·91
July	11	9·2	0·91	1·17
August	3	7·9	0·10	0·52
September	8	7·3	0·70	0·79
October	9	3·1	0·81	0·64
November	6	6·1	1·99	1·81
December	7	10·0	1·68	5·05
	101	103·8	22·96	33·73

TEMPERATURE

°Fah.

Months	Mean		Absolute		Mean Relative Humidity
	Max.	Min.	Highest	Lowest	%
January	85	79	89	72	65·7
February	86	78	90	67	64·6
March	84	77	89	71	70·2
April	82	77	86	68	69·0
May	79	73	85	64	66·0
June	77	71	81	61	64·0
July	75	69	79	60	63·4
August	76	69	82	59	62·3
September	78	70	82	61	63·4
October	79	72	84	64	60·7
November	82	73	87	67	59·3
December	84	76	89	68	63·1
	81	74	90	59	64·3

Staff. The post of Government Tobacco Officer remained vacant throughout the year, the writer having been appointed thereto in an acting capacity as from 6th January, 1948. The Junior Research Assistant, Mr. R. Gnany, resigned on the 15th June, 1948, and was replaced by Mr. G. Naidoo as from the 16th June, 1948. The other members of the staff, comprising the Senior Research Assistant, the Clerical Assistant and the Overseer were on duty throughout the year.

Rotation Crops. The chief factors affecting the choice of a proper rotation programme at the Station are the heavy infestation of the fields with Black Shank, nematodes and weeds and the poor physical condition of the soil which is also very deficient in organic matter. From 1939 to 1946, tobacco has been planted on the same land once every three years, the intermediate crops being maize or a green dressing such as pois mascate (*Stizolobium* sp.) which was dug under whenever labour was available. Some of these crops provided a very good cover during the wet hot months but left the land bare during the dry season with the result that the very noxious weed Chiendent (*Cynodon dactylon*, Pers.) rapidly invaded the fields. The stems *(soboles)* of this pest penetrate very deeply in the soil, so that its removal with the hoe is a very expensive and lengthy process in which some of the subsoil, is inevitably mixed with the topsoil, with consequent ill effects on the succeeding tobacco crop. Since 1945, as much land as possible has been put under cane immediately after the tobacco crop. The cane varieties planted at the Station include M.134/32, M.112/34, M.165/38, M.63/39, M.76/39 and six varieties of Barbados canes. Interrow spacings of 6 feet, 5 feet, 4½ feet and 3 feet are being tried for their effect on the control of chiendent. A field heavily infested with chiendent was planted with cane in 1946 and the cane was uprooted at the end of 1948 during the preparation of the land for the 1949 tobacco crop when it was found that 188 men days were required to dig one acre of land as compared to 322 men days required in an adjoining field. It was also found that the stems of chiendent remaining in the cane plantation were much less dense and deep than in the control field.

Diseases and Insect Pests

(i) *Seed Beds.* The usual seed bed diseases, such as damping off *(Phytium de Barryanum,* Bary) *(Rhizotocnia solani,* Zuhn) and frog eye (*Cercospora nicotianæ,* Ell and Ev.) were of very slight occurrence and caused practically no damage. The application of Cheshunt Compound at the rate of 150 gms. per 100 sq. ft. of surface, prior to sowing has proved to be a very good preventive and was adopted as general routine practice in the preparation of seed beds. Gammexane, in the form of diluted Agrocide 7 was very effective in the control of red ants *(Solenopsis geminata)* and cut worms.

(ii) *Fields.* The chief disease in the fields was Black Shank (*Phytophtora nicotianæ,* Breda de Haan) (*P. parasitica* var *nicotionæ,* Tucher) which was prevalent throughout the year and caused considerable damage. Frog eye which was prevalent during the first months of the year caused a lowering in the value of the cured leaf. A slight attack of mildew (*Oidium tabaci* D.C.) occurred in July-August in the Air Curing Variety Trial and was kept in check by priming. A few isolated cases of mosaic were also recorded.

The leaf miner *(Phthorimaea operculella,* Zell) caused some damage to the young plants in the field, more particularly during the hotter months of the year. Besides eating the substance of the young leaves, the young larvae also bore down the tender stem, causing the death of the plant in extreme cases. A small trial indicated that gammexane dust applied around the young plant is effective in controlling this pest.

An important root disease of tobacco is root-knot which was prevalent throughout the year. The small ellworms or nematodes (*Heterodora marioni* Cornu) live in the roots, causing them to swell in the form of knots or galls with the result that the plant becomes stunted, more or less yellow and more subject to wilting during dry weather. An experiment is in progress in which the soil fumigant " D.D. mixture " (a mixture of unsaturated chlorinated compounds containing dichloropropene-dichlopropane) is being tested for the control of nematodes in the field. Breeding of varieties and strains of tobacco which are resistant both to nematodes and Black Shank is also being carried out at the Station.

Fertiliser Experiments. Dr. Carson has pointed out that since the yield and the quality (including flavour and aroma) are affected by fertilizers, these experiments may be regarded as esssential part of any systematic programme of tobacco improvement. Thus the following experiments were conducted during the year—

(i) Amarello Fertiliser Experiment

This was a $3N \times 3P \times 3K$ factorial experiment designed to obtain information on the response of the variety Amarello pointed leaf to the principal fertiliser elements. The design adopted was the partially confounded incomplete blocks with two replications and plots 1/75 of an acre. The following levels of fertilisers, in the form of sulphate of ammonia, super-phosphate and sulphate of potash were tested—

Nitrogen levels	*Phosphate levels*	*Potash levels*
N_1=16 kgs N per acre	P_1=50 kgs P_2O_5/acre	K_1= 6 kgs K_2O/acre
N_2=24 ,,	P_2=60 ,,	K_2=12 ,,
N_3=32 ,,	P_3=70 ,,	K_3=18 ,,

One-third of the total amount of fertilizer mixture was applied before planting, one-third four weeks after and the remaining one-third eight weeks after. The experiment was planted on the 11th February and the results are tabulated hereunder—

Yields kgs per acre ±14·31

	N_1	N_2	N_3	K_1	K_2	K_3	*Means ±8·26*
P_1	666	683	672	649	641	729	673
P_2	625	668	703	638	679	679	665
P_3	600	680	695	649	663	663	659
Mean ∓8·26	629	677	690	646	661	690	665·6 ±4·77

Yields kgs per acre ±14·31

	K_1	K_2	K_3	*Mean ±8·26*
N_1	605	624	660	629
N_2	655	666	691	677
N_3	677	674	719	690
Mean ±8·26	646	661	690	665·6±4·77

Thus the higher the level of nitrogen or potash the higher the yield, N_2 and N_3 being significantly higher than N_1, and K_3 higher than K_1 and K_2. The phosphate fertilisers seem to have a depressing effect on the yield, though the differences between the levels were not significant.

	Grade Index ± 7·54						
	N_1	N_2	N_3	K_1	K_2	K_3	Mean ± 4·35
P_1 ...	325	322	317	317	326	322	321
P_2 ...	332	329	314	329	333	313	325
P_3 ...	350	334	322	335	341	330	335
Mean ± 4·35	336	329	317	327	333	322	327·3 ± 2·51

	Grade Index ± 7·54			
	K_1	K_2	K_3	Mean ± 4·35
N_1	328	345	333	336
N_2	338	333	315	329
N_3	315	321	316	317
Mean ± 4·35	327	333	322	327 ± 2·51

The mean for N_3 is significantly less than for N_1. There is no significant difference between N_1 and N_2 or between the other fertiliser levels.

Samples from each plot were forwarded to the Chemical Division for determination of total sugar content. From the results it does not appear that the various fertiliser treatments have affected the sugar content of the leaf.

(ii) Nitrogen and Variety Trial

This experiment was designed to compare the yield and quality of these varieties—Bonanza (Bo), Amarello pointed leaf (Ap) and Amarello broad leaf (Ab)—under two nitrogen fertilizer treatments—0 Kg. N per acre (N_1) and 16 Kgs N per acre (N_2). The design was the randomised block design with four replications, each varietal plot of 1/150 acre being spilt in two, half receiving nitrogen at the rate of 16 Kgs N per acre in the form of sulphate of ammonia. 300 Kgs of Superphosphate and 25 Kgs of sulphate of potash per acre were applied to all plots. The fertilizers were applied one week before planting, the experiment being planted on the 26.6.48.

	Yields Kgs per acre ± 34·79			
	Bo	Ap	Ab	Mean ± 13·95
N_1 ...	88	147	182	139
N_2 ...	247	459	405	371
Mean ± 13·43	168	303	294	255

The yields were very low in consequence of the dry weather and of the scanty supply of irrigation water and the results of the experiment are limited in value. The yields of Ap and Ab are highly significantly better than that

of Bo, and N_2 is highly significantly better than N_1. The interaction between variety and fertilizer treatment was significant, indicating that the effect of the absence of nitrogen is greater on the yield of Ap than on those of Bo and Ab.

	Grade Index ±15·94			
	Bo	*Ap*	*Ab*	*Mean±9·20*
N_1 ...	392	307	319	306
N_2 ...	322	410	405	379
Mean±12·34	307	359	362	343

N_2 is highly significantly better than N_1, and Ab, Ap are significantly better than Bo. Thus a nitrogen fertiliser appears to be indispensable both for the yield and the colour of the leaf.

(iii) Copper Experiment

The Lighter, Volume 18 No. 2, reports that as a result of experiments carried out in U.S.A. it was shown that in a large number of cases the application of copper sulphate to the soil had the effect of increasing the yield and improving the quality of tobacco. Accordingly, an experiment was set out at the Station in which various levels of copper sulphate were tested for their effect on Amarello pointed leaf, but the results were negative.

Breeding and Selection. The object of this work is to supply planters with seeds of commercials varieties, of which the most favoured is Amarello, and to produce ultimately a strain or variety suitable to local conditions but with a flavour superior to Amarello.

Selected strains of the commercial varieties were planted both in Variety and Strain Trials and in progeny plots where mass selection was carried out and a good supply of seed obtained for distribution to planters in 1949.

Other varieties, including the newly imported ones, and the various hybrids were planted in several trials. In all cases, field notes and notes on the cured leaf were taken for each plot, and for the selections made therein. After harvest, the percentage infection of the roots of the plants with Black Shank and nematodes was ascertained. Samples of cured leaf from both the plots and the selections were baled for subsequent smoking tests. It was thus possible to compare the yield, the curing properties, the quality of the cured leaf (including flavour), the resistance to Black Shank disease and nematodes of the varieties, strains or hybrids planted in each trial, and to retain only the two best selections of the more desirable ones.

The trials were for convenience divided into the following units—

(i) Amarello Trial

The object of this experiment was to test various strains of Amarello pointed leaf for yield and quality. It included five station selections, two selections made on tobacco growers' estates in 1947 and two mass selections carried out at the Station and on La Joliette Estate. The experiment was laid out in a randomised block design with three replications and plots

1/150 acre and planted on the 30th January 1948. The fertilizers were applied in three equal portions at intervals of 4 weeks, making a total of 24 Kgs N, 60 Kgs $P_2 0_5$ and 12 Kgs $K_2 0$ per acre.

Strain No.	*Strains*	*Actual yields kgs per acre ± 54·9*	*Grade Index ± 7·33*	*Mean % infection of roots by Black Shank ± 5·53*
1	Am 2-43-1-1-2	510	321	43·0
2	Am 2-43-1-1-1-2	566	316	48·3
3	Am 2-43-1-1-1-4	496	317	60·7
4	Am 1-45-1-2	729	314	43 6
5	Am 1-45-1-4	703	308	42·8
6	Am 1-47	700	323	58·0
7	Am 2-47	750	327	37·6
8	Am mass T.R.S.	610	330	46 6
9	Am mass La Joliette	605	336	49 0
	Mean	629 ±18·3	321 ± 2 44	47·7 ± 1·84
	Significant difference between 2 strains 5 % P	164·9	Not significant	
	Coefficient of variation	15·01%	3·95%	20·07%

Yield Results

7 better than 1, 2 and 3.

4, 5 and 6 better than 1 and 3.

The experiment will be repeated with the best selections made in Nos. 2, 4, 5, 6 and 7 and progeny plots will be planted with the selections of Nos. 4 and 7.

(ii) Progeny Plots

The varieties Bonanza, Jamaica Wrapper, Virginia Bright, White Mammoth, Yellow Mammoth, White Stem Orinoco, Amarello pointed leaf and Amarello broad leaf (air cured) were planted with the best selections made in 1947. The following quantity of seed was forwarded to the Tobacco Board for distribution to planters, free of charge, for the 1949 crop—

	Kgs.
Amarello pointed leaf	6½
Amarello broad leaf...	4
Bonanza	3½
Jamaica Wrapper	2
Other Varieties	3½
Total ...	19½

Mass selection was also carried out in a very good Amarello plantation at Pamplemousses and 3½ Kgs of seed were obtained.

(iii) Hybrid Trial I

In this experiment seven homozygous hybrids between the varieties Amarello and Bonanza from the Hybrid Trial of the preceding year together with Amarello were planted in a latin square. The variety Amarello was included in the experiment according to the suggestion of Dr. Carson who pointed out 'that unless the value of the hybrids equals Amarello, improvement in flavour and aroma alone will not lead to their general cultivation.' The fertiliser treatment was the same as (i) above and the plots

1/75 acre. Black Shank infection occurred soon after the experiment was planted(4th February 1948) and its effect was very severe in the more susceptible hybrids, reducing the number of plants harvested and consequently the yield to a considerable extent. The results of the experiment are tabulated hereunder—

Hybrid No.	*Denomination*	*Generation*	*Parentage*	*Actual yields kgs/acre ±23·35*	*Grade Index ±6·61*	*Percentage plants harvested ±3·33*	*Flavour test (Plot samples bright leaf)*
1	Am2–43–1–1–1–2 ...			629	330	86·7	Strong earthy tang
2	X4–41–1–2–2–1–5 ...	F6	Bo × Am	399	375	57·9	Very slight tang
3	X5–41–2–2–3–5–1 ...	F6	Bo × Am	476	361	78·9	,,
4	X4–42–5–12–2–2 ...	F5 of 1st back cross	Bo × Am × Bo	524	351	79·4	,,
5	X6–42–1–3–1–2 ...	,,	Bo × Am × Am	505	390	85·2	Earthy tang
6	X6–42–1–3–3–3 ...	,,	,,	572	396	81·9	Slight earthy tang
7	X6–42–1–3–4–2 ...	,,	,,	505	338	74·0	Earthy tang
8	X11–42–1–1–3–1 ...	,,	,,	552	383	83·3	Earthy tang
		Mean		520 ± 8·26	366 ±2·33	78·4 ± 1·13	
	Coefficient of variation			12·7%	5·11%	11·61%	
	Significant difference						
	5%			66·7	18·9	9·2	
	1%			88·7	25·1	12·2	

Significant differences—

YIELDS—

1	better than	8	highly better than 4, 5, 7, 3, 2
6	,,	5, 7	,, 3, 2
8	,,	3	,, 2
4, 5, 7			,, 2
3	,,	2	

GRADE INDEX—

6	better than	2	highly better than 3, 4, 7, 1
8	,,	3	,, 4, 7, 1
5			,, 3, 4, 7, 1
2	,,	4	,, 7, 1,
3, 4	,,	7	,, 1.

% PLANTS HARVESTED—

1, 5, 8	better than	7	highly better than 2
6, 4, 3, 7			,, 2.

The smoking tests were carried out with the co-operation of the Manager, Tobacco Warehouse on leaf samples of 1947 and 1948. Both the leaves from the plots of each hybrid and from the selections therefrom were tested. The flavour was almost uniform in the two generations of the hybrid.

From the above results, it may be assumed that X6–42–1–3–3–3 is a slight improvement of the Amarello, but the tang has only been partially removed. X4–42–5–12–2–2 is superior to both in flavour but its yield is significantly less than that of Amarello. Thus further work seems to be necessary before the hybrids can be released for tests on a commercial scale.

(iv) Hybrid Trial II

15 other hybrids from the Hybrid Trial of 1947 and the variety Amarello were planted in this experiment. The design was the balanced incomplete blocks with five replications and plots 1/300 acre. The experiment was planted on the 16th June. Considerable segregation was evident and occurred in many of the hybrid plots, but a few were almost homozygous for vegetative characteristics—

Hybrid No.	*Denomination*	*Parentage*	*Generation*	*Adjusted values*		*Flavour Test*
				Actual yields kgs/acre ±35·36	*Grade Index* ±9.48	
1	V 1–42–1–2–1–3	SM × Bo × Bo	F 5 of B.C.	409	349	Very slight tang if any
2	V 5–45–1–3	JW × Amp	F 3	531	354	Earthy tang
3	V 5–46–1	Amb × Bo	F 2	495	378	,,
4	V 9–45–1–1	Amp × Bo	F 3	303	358	Very slight tang
5	V 11–41–1–1–1–2–2	SM × Bo	F 6	394	320	Slight tang
6	V 27–46–1	Amb × JW × Am	F 2 of B.C.	296	305	Earthy tang
7	V 32–45–1–3	CS × Am × Am × Am	F 3 of 2nd B.C.	388	324	Disagreable flavour
8	V 39–46–1	CS × Am × Am × Am	F 2 of 2nd B.C.	425	375	Earthy tang
9	V 40–45–1–1	WP × Am × Am × Am	F 3 of 2nd B.C.	258	299	Very slight tang
10	X 4–42–5–1–2–1	Bo × Am × Bo	F 5 of B.C.	501	403	—
11	X 4–45–1	Bo × Am × Bo × Bo	F 2 of 2nd B.C.	450	375	Slight tang
12	X 5–41–2–2–3–1–1	Bo × Am	F 6	494	405	Earthy tang
13	X 6–42–1–3–4–3	Bo × Am × Am	F 5 of B.C.	473	341	Earthy tang
14	X 7–45–1	Am × (Bo × Am × Bo)	F 2 of 2nd B.C.	498	377	,,
15	X 10–42–1–3–1	Bo × Am × Bo	F 4 of B.C.	618	392	Very slight tang
16	Am 2–43–1–1–1–2	—	—	557	396	Strong earthy tang
		Mean		443 ±8·84	360 ±2·37	
		Coefficient of variation		15·9%	5·9%	
		Significant difference—				
			5% P	100·7	30·2	
			1% P	134·5	40·3	

Results—

Yields. 16 better than 8, 11, highly better than 1, 4, 5, 6, 7, and 9 but not better than 2, 3, 10, 12, 13, 14 and 15.

Grade Index. 16 better than 4, highly better than 1, 2, 5, 6, 7, 9 and 13 but not better than 3, 8, 10, 11, 12, 14 and 15.

Some hybrids more particularly X10–42–1–3–1 and X4–42–5–1–2–1 seem to be worthy of further trials.

(v) Hybrid Trial III

Repeated trials have shown that the Hybrid Bonanza × Amarello is equal in yield and superior in grade of leaf to Amarello and superior to Bonanza in both. Accordingly, a large number of crosses were carried out in 1947 and 1948 with the object of providing sufficient seed for tests on some tobacco growers' estates. The hybrid was planted in various parts of the Island in 1948. In general, the yield was fair and the colour of the leaf very bright but the smoking tests showed that the earthy tang was still persistent though less pronounced than in the Amarello parent.

The Hybrid Trial III was designed to test 51 F1 hybrids between the Amarello and the varieties Bonanza, Jamaica Wrapper, Virginia Bright, White Mammoth, Yellow Mammoth, White Stem Orinoco, White Stem Pearl, White Stem Willow leaf, Oxford 1, Oxford 3, Florida 301 and White Amarello with 13 parents for yield and quality of leaf. The lattice design with four replications and plots 1/300 acre was adopted and the experiment was planted on the 17th May, 1948.

The plantation suffered from drought and Black Shank disease so that the yields were reduced to such an extent as to render the results inapplicable to normal conditions. The hybrids of Oxford 1, Oxford 3 and Florida 301—three Black Shank resistant varieties imported from Florida, U.S.A. in 1947—were much more vigorous and resistant to disease than the others. Selections of these hybrids were therefore back crossed to each parent of the varieties for further tests and a new set of crosses between Amarello and the other varieties were made for repeating the trial in 1949.

(vi) Black Shank Resistance Trial

The work of breeding varieties and hybrids of Rg. resistant to Black Shank disease was continued with strains selected from the trial of the preceding year. Rg. is a cigar wrapper variety imported from Florida U.S.A., and has proved very resistant to the disease under local conditions. 23 Rg.

hybrids, 10 parent varieties and three new varieties were included in the trial of 1948, which was planted on the 18th April, in a lattice design with four replications and plots of 1/300 acre. The results are tabulated hereunder—

Strain	*Parentage*	*Generation*	*Sets x.y*	*Adjusted values of*			
				Actual Yields	*Grade Index*	*% root infection*	*% plants harvested*
S30-46-1-2	Bo × Rg	F3	6,4	392	267	36·4	102·1
S32-47-4	Rg × Bo × Rg	F2 of B.C.	3,2	453	300	27·1	102·1
S33-46-1-4	JW × Rg	F3	6,1	363	288	40·7	90·4
S34-47-2	Rg × JW × Rg	F2 of B.C.	3,5	356	261	26·4	105·0
S9-46-2-3	VB × Rg	F3	5,1	380	280	42·0	87·5
S12-47-2	Rg × VB × Rg	F2 of B.C.	5,2	401	275	22·9	97·9
S13-46-1-6	WM × Rg	F3	5,3	464	310	43·6	89·6
S16-47-1	Rg × WM × Rg	F2 of B.C.	3,6	363	262	35·5	97·5
S20-46-1-3	Rg × YM	F3	3,3	416	351	41·1	95·0
S20-47-5	Rg × YM × Rg	F2 of B.C.	4,2	394	331	45·4	90·4
S21-46-1-6	WO × Rg	F3	2,3	369	330	42·2	90·4
S22-47-4	Rg × WO × Rg	F2 of B.C.	1,4	407	305	54·7	92·9
S25-46-1-2	Amp × Rg	F3	1,5	471	332	21·4	100·4
S25-47-3	Amp × Rg × Amp	F2 of B.C.	5,4	513	343	23·2	94·6
S26-47-5	Rg × Amp × Rg	F3 of B.C	1,3	400	307	20·6	90·8
S27-47-3	Amb × Rg × Amb	F2 of B.C.	3,4	499	389	24·7	96·7
S28-46-1-6	Rg × Amb	F3	1,6	456	310	23·2	93·7
S28-47-5	Rg × Amb × Rg	F2 of B.C.	4,6	369	241	40·1	91·2
S38-46-4	Rg × Wp	F2	4,5	370	316	58·2	90·4
S40-46-1	Rg × WL	F2	6,3	395	282	36·1	91·7
S42-46-2	Rg × HP	F2	2,4	357	313	53·3	80·0
S43-46-4	YP × Rg	F2	1,1	402	328	47·1	86·7
S45-46-3	WAm × Rg	F2	2,1	438	331	54·6	90·4
Bo			1,2	373	342	72·4	76·7
JW			2,6	338	344	69·3	73·3
VB			5,5	451	314	62·1	80·0
WM			2,5	381	338	64·1	75·8
YM			6,5	452	331	43·4	102·1
WO			4,4	381	373	78·5	72·9
Amp			3,1	445	370	46·7	85·4
Amb			4,3	459	383	47·6	88·3
WL			5,6	376	302	64·0	77·9
Rg			6,6	274	247	26·2	87·1
Oxf. 1.			2,2	425	292	50·0	95·8
Oxf. 3.			6,2	429	311	37·5	101·2
Flo. 301.			4,1	301	289	47·5	92·5
Mean			—	403·2	313·4	43·3	90·5
Significant difference 5% point—							
Same set			—	108·39	150·07	18·98	12·9
Different set			—	115·86	53·53	20·29	13·7
Coefficient of variation			—	17·74%	10·52	28·87	9·39%

The yields are in general rather low. According to the results of this experiment the yield of most hybrids are not significantly less than that of Amarello.

The greenish tinge which the cured leaf of the hybrids inherits from Rg. parent was less pronounced this year that in the trials of 1946 and 1947. The grade index of the hybrids was lower than that of Amarello. Back crossing of a hybrid to the Rg. hybrid parent has resulted in a lowering of the grade cured leaf of the progeny whereas the back crossing of some hybrids to their Amarello parent had the reverse effect.

The standard error of the percentage of root infection is very high. When the roots of the plants were examined on the same day after the whole experiment had been harvested it was found that many of the early harvested plants had died and that it was not possible in such cases to ascertain exactly the percentage infection of the roots by Black Shank. The resistance of most hybrids is not significantly less than that of Rg. but on the contrary better than that of the other parent varieties.

The Amarello hybrids were very vigorous and amongst the best for yield, grade index and resistance to disease but their flavour has inherited much of the objectionable earthy tang of the Amarello.

The colour of the cured leaf of the two varieties, Oxford I and Oxford 3 has improved to some extent since they were first tried in 1947. Oxford I has a neutral flavour, and might be used as a breeding stock. Florida 301 is almost identical to the cigar wrapper variety Rg. but is less resistant to disease.

(vii) Air Curing Variety Trial

The varieties Piet Retief, Greenwood, Maryland, Harrow Velvet, Duquesne, Rg. Amarello pointed leaf and Amarello broad leaf together with some Rg. and Amarello F1 hybrids and the S28–46–1–6 were included in this experiment. The lattice design with 4 replications and plots of 1/300 acre was also adopted and the experiment was planted on the 17th June.

Hybrid Variety	*Parentage*	*Sets X,Y*	*Adjusted values*	
			Actual yield	*Grade Index*
V 90 –47	Amp × RR	2,5	591	509
V 92 –47	Amb × PR	2,4	537	511
S 28 –46–1–6	Rg × Amb	1,5	540	419
S 47 –6 –1	HV × Rg	1,3	340	320
S 48 –6 –1	Rg × HV	4,2	386	337
S 89 –47	Amb × Rg	3,4	735	562
S 90 –47	Rg × Amb	3,2	560	499
S 93 –47	HV × Rg	1,1	366	361
S 94 –47	Rg × Hv	5,3	375	290
S 95 –47	Dq × Rg	2,1	467	307
S 96 –47	Rg × Dq	1,4	497	412
S 97 –47	PR × Rg	3,5	587	414
S 98 –47	Rg × PR	3,3	566	422
S 99 –47	GR × Rg	4,1	433	389
S 100–47	Rg × GR	5,5	399	274
S 101–47	MR × Rg	4,3	441	320
S 102–47	Rg × MR	3,1	463	382
PR 1/47		5,4	457	503
GR 2/47		4,4	290	420
MR 2/47		2,2	438	357
HV 1/47		1,2	256	420
Dq 1/47		2,3	346	373
Rg 1/46–5–2		4,5	384	226
Am 2–43–1–1–12		5,1	672	506
Am 2–44–1–1–1		5,2	614	523
Mean			469·5	402·4
Significant difference 5% – same set ...			118·8	96·02
different set ...			128·4	103·70
Standard deviation			76·50	61·82
Coefficient of variation			16·3 %	15·36%

Amarello broad leaf is the variety grown by the local air curers. Except for S98–47 and the Amarello hybrids, all the other hybrids and varieties are significantly lower in yield and grade of leaf than the Amarello.

(viii) WHITE BURLEY TRIALS

Seed of White Burley received from Petauke, Northern Rhodesia, in September, was sown with the object of renewing the Burley Trials, as there is at present a good foreign market for this type of leaf. A $3N \times 3P \times 3K$ factorial experiment, and a manurial experiment were planted with this variety at the end of the year. Climatic conditions were not a very favourable both for the growth of the plants and for the curing of the first primings. The experiment is not yet completed.

Educational. The three apprentices appointed by the Tobacco Board in 1945 completed their training at the Station, in April 1948. At the end of their training, the Tobacco Board appointed two of them as instructors to assist tobacco growers in the districts of Rivière du Rempart and Pamplemousses, and the third one was appointed as Breeding Assistant at the Station. One new apprentice joined the Station in July of the year under review so that there are now six apprentices undergoing their training at the Tobacco Research Station.

General. On the 2nd October 1948, one barn and its contents, together with the adjoining stringing shed were accidentally burned. A new stringing shed and a labourers rest room were erected at the end of the year.

E. LESUR,
Acting Government Tobacco Officer.

Appendix 10

Entomological Division

1. Staff

The Entomologist was appointed in November 1947 and assumed his duties in Mauritius on 7th January, 1948.

A number of staff changes were made during the year, the most notable being the filling of the posts created under the Development and Welfare Plan. Mr. L. A. Moutia was seconded for duty as the Supernumerary Entomologist, Mr. R. Mamet acting in his stead as Assistant Entomologist. The posts of Technical Assistants were filled by Messsrs. F. Nadeau and S. Félix.

Mr. P. R. Hermelin was appointed as Timber Investigation Officer, while Mr. P. Regnard, Phytalus Officer, left the Division after 21 years service to assume duties with the Agricultural Division. Acknowledgment must be made of the valuable work performed by Mr. Regnard during his long association with this Division.

2. Pests of Sugarcane

Clemora Smithi (Arrow). This white grub still ranks as one of the major insect pests of the island. Severe localised attacks were evident during the year in various parts of the island, while attacks of lesser intensity were common.

(a) Parasite Control

The planting of *Eupatorium pallescens,* as a food-plant for the various species of Scoliid parasites, was encouraged in those areas of cane fields devoid of flowering plants. Many cuttings were supplied to various estates. Colonies of the Scoliids *Tiphia parallela* Sm. and *Campsomeris* spp. were released in localities which were apparently without them

The search for foreign parasites to further the biological control of *Clemora* was continued. Mr. L. A. Moutia arrived in Morocco in August to collect and dispatch the two larval parasites *Dexiomorpha picta* Meig. (Tach.) and *Tiphia morio* F. (Scol.), and also, if possible, the adult parasite *Hyperecteina cinerea* (Tach.). At the time of writing, the first shipments of *Dexiomorpha* are arriving.

On 1st December a large shipment of the Tachinid *Dexia rustica* F. arrived from England. They were sent as larvæ within their host grubs, *Melolontha melolontha* L. A second shipment is expected. No liberations have yet taken place.

(b) Insecticidal Control

Experiments to assess the potentialities of *Benzene Hexachloride* as a means of control were continued, a series of trials was initiated involving its application by various methods at different times of the year. In all the experiments described below, the *Benzene Hexachloride* was in the form of a dust containing 2·6 per cent gamma isomer. Application was by hand after first being mixed with fairly dry soil as a diluent.

Clemora has a well-defined life-cycle, the adults are on the wing from mid-November to March, while the period of greatest larval activity, and consequently of crop damage, is from April to August.

Preliminary experiments in 1947 gave negative results when the insecticide was applied during the larval season. To elaborate these experiments, a very badly attacked field was selected, and using a Split-Block layout with 5 replications, the dust was applied at the rates of 150, 100, 50, 25 and 0 kilograms per arpent (1 arpent = 1·043 acres). Each plot consisted of a 20-foot length of row, there being a guard plot of one row between each treatment plot. The dust was applied as a band approximately 18 inches wide along the rows. In one half of each Split-Block it was worked in with hoes, in the other half the insecticide was left on the surface.

Results were assessed one month later. A trench was dug along the whole length of each row-plot and the larvæ counted. There was no significant difference between any of the various treatments.

With the residual properties of *Benzene Hexachloride* in mind, applications were made at the close of the flying season, i.e., late January and February, to investigate its use as a preventive rather than a cure. Application at this time has the advantage that planting cultivations often coincide so that mixing the insecticide with the soil is facilitated. Two methods of application were used—

(a) broadcasting prior to cleaning and ploughing ;

(b) distributing in the open furrows. The layout was always in the form of a 4×4 latin square, the size of the plots being 30 feet $\times$ 6 rows, the rows being approximately 5 feet apart, while the rates of application were 100, 50, 25 and 0 kilograms per arpent.

Results were assessed by larval counts during the larval season (June), trenches 10 feet long being dug in the lines and interlines of each plot. The number of trenches dug per plot varied in different experiments, in some it was eight, in others six. As before, results were entirely without significance. It must be recorded that only a light infestation, not of sufficient magnitude to cause damage to the cane, occurred in the fields containing these experiments.

In November, i.e., at the beginning of the flying season, a third series of experiments was commenced. Fields of virgin cane were selected and latin square experiments laid out involving the application of the dust to the soil surface by broadcasting, and also in a band along the stools. The results of these experiments are to be assessed in the coming larval season.

Proceras Sacchariphagus Boj., the Spotted Borer. The importation of the West Indian moth borer parasite, *Lixophaga diatræa* Tns. was continued. The insects were sent from Trinidad by Dr. F. J. Simmonds of the Commonwealth Bureau of Biological Control. A total of 30 shipments was sent during the period April–November ; one was never received, while three were a complete loss owing to delay in transit.

The following summarises the results of these shipments—

Total number dispatched as pre-pupae and pupae ...	2,966
Usual number of days in transit	14
Total number received as pupae	2,152
Total number adults emerged (approximately) ...	1,500
Total number released	709

The insects were released in six localities which were heavily infested with *Proceras*. With the 141 flies released in 1947, the total number of *Lixophaga* liberated in Mauritius is 850, in eight colonies of approximately 100.

After emergence and mating, the flies were retained for the incubation period of the eggs. Considerable mortality occurred during this period which was sometimes as much as 25 days, depending upon the season (*see* Annual Report 1947). It was considered advisable, however, that the adults should be ready to larviposit on, or soon after, release.

Inoculation of fully grown *Proceras* larvæ with *Lixophaga* planidia were made, about 30 per cent of which were successful. This figure compares unfavourably with the almost 100 per cent success which can be obtained using the natural host, *Diatræa saccharalis* F., in the West Indies. The suitability of *Proceras* as a host for *Lixophaga* is accordingly to be queried.

A parasite bred from the Pink Borer, *Sesamia vuteria* Stoll., in January was identified as *Bracon albolineatus* Cam. This is the first recovery made since its introduction from Ceylon in 1939. A parasite survey of the moth borers is to be made next year when its actual status will be assessed.

3. The Control of the Eucalyptus snout beetle, Gonipterus scutellatus Gyll

The Mymarid egg parasite, *Anaphoidea nitens* Gir. which was introduced in 1946, has now reduced the status of *Gonipterus* to that of an occasional pest. At Nouvelle Découvete and a few other localities there were sporadic outbreaks of some severity. These attacks were always of short duration and when officers of the Division were called to investigate, it was invariably found that the attack was over and egg parasitism high.

Two parasite surveys were carried out, one in July–August, and the other in November–December. *Gonipterus* egg capsules were collected from localities all over the island and the percentage capsule and egg parasitism worked out. The results may be summarised thus—

	No. localities visited	*No. localities Anaphoidea present*	*Total No. egg clusters collected*	*Mean% clusters parasitised*	*Mean% eggs parasitised*
July–Aug.	... 21	18	895	33·3	29·3
Nov–Dec.	... 21	19	491	56·1	39·5

The detailed figures obtained showed that the degree of parasitism varies greatly from area to area, and also within the same area at diffffferent periods. The percentage egg parasitism in different localities varied from zero to 99·4 per cent. The locality in which this latter figure was obtained in August had, in December, 38 per cent egg parasitism. It is hoped in the near future to publish a detailed account of the biology of *A. nitens* in Mauritius.

4. Control of Black Sage, Cordia Macrostachya, Jacq.

Liberations of the leaf eating beetle, *Physonota alutacea* Boh. *(Cassididæ)* which commenced in July 1947, were discontinued in May, after 21,000 adults, 4,000 larvæ and approximately 7,000 eggs had been released. *Physonota* has proved incapable of competing successfully with the Mauritian fauna, and has apparently failed to establish itself in any of the 44 localities where it was released. The common non-predatory black ant, *Technomyrmex detorquens* Wlk., which attends *Cordia* bushes in considerable numbers for its juices, disturbs the feeble first instar larvæ so that they fall from the foliage. Investigations showed that the influence of *Technomyrmex* alone must be considered sufficient to prevent any considerable multiplication of *Physonota* in Mauritius. In addition the common predatory ants, *Solenopsis geminata*

Fab., and *Pheidole megacephala* Fab. are known to carry off the young larval stages. *Pheidole*, in addition to its predaceous habits, attends the bushes for nectar, its abundance on the plants being roughly in an inverse proportion to the abundance of *Technomyrmex*. In the few localities where *Technomyrmex* was not found, *Pheidole* commonly replaced it.

After thorough feeding tests, the liberation of a second Coleopteran, *Schematiza cordiae* Barb. *(Galerucidæ)* was commenced in March. Breeding and liberation is continuing, 16,200 adults having already been released in 15 localities. This insect is now firmly established and has shown no tendency to attack other plant species. Its reproduction in the field is apparently not restricted by local parasites or predators. Collections of eggs and larvae have revealed no parasites, while the only predator seen with any frequency is a *Pentatomid*, identified by the Commonwealth Institute of Entomology as *Afrius* sp. The ants which resulted in the failure of *Physonota* do not affect *Schematiza*.

The localities where *Schematiza* is multiplying are situated in sheltered regions of the Uplands ; in these areas the *Cordia* foliage is succulent in comparison with the small, tough leaves so characteristic of *Cordia* in the dry coastal regions and in the more exposed areas of the uplands. In this respect it is noteworthy that there is a decided preference for seedlings, young plants, and for the growth put out by the stocks of cut bushes. The defoliating capacity of *Schematiza* is accordingly most striking where the scrub has been cut back ; new growth is even and defoliation of an extensive area is possible.

Since the earlier liberations several field generations have been accomplished. During the drier winter season, activity was greatly reduced and for many weeks very few eggs and larvae could be found at the liberation sites, although adults were commonly seen. With the onset of the summer season, however, larvae became very numerous, resulting in considerable defoliation not only of young plants but also of large mature plants. In addition to leaf damage by larvae and adults, the former feeds upon the fruits. This results in the destruction of the seed if the fruit is attacked before the hardening of the pericarp.

Little dispersion of the colonies has yet occurred, damage to bushes not being evident beyond about 200 yards from the point of release. It will be possible to assess the value of *Schematiza* with more accuracy when it has passed through a complete summer season.

It is intended shortly to introduce another form, or race, of *Schematiza* from Grenada, which differs from the Trinidad form in copulation. Dr. Simmons in Trinidad reports that the two forms have similar habits and interbreed freely. It is thought that the Grenada form may have slightly different optimum conditions which will enable it to succeed in areas unsuitable for the Trinidad form.

Other species which are to be introduced are—

Eurytoma n. sp. *(Eurytomidae)*.

Lamprosema inabsconsalis (Mosch.) (Pryraustidae).

Chloropteryx sp.(Geometridae).

Eurytoma n. sp. is a phytophagous Chalcidoid which develops within the seeds of *Cordia*. Several trial shipments have been received from Trinidad and a successful method of packing found. Very few *Erytoma* were obtained from the seeds received in these shipments owing to high degree of parasitism by other species of Chalcidoids. Very large seed shipments will be necessary to obtain adequate numbers for liberation.

Of *Lamprosema* and *Chloropteryx*, 3 trial shipments of the former, and one of the latter have been received. Extensive feeding tests will be necessary before the release of these Lepidopterans can be considered.

5. Miscellaneous Pests

(a) Cratopus punctum F. and *C. brachialis* Boh. were common pests during the year ; these two weevils which have similar habits and which are usually found together, are most ubiquitous in their choice of food-plants. Plants of economic importance found to be attacked during the year were Camphor, Maize, Sweet Potato, Manioc and Mascate Peas. Several fields of Maize were found to be severely attacked, while damage to Camphor trees was general, though not of an intensity to cause concern.

With food crops a spraying with lead arsenate is recommended as soon as an attack becomes evident. Notification of attack usually comes too late for spraying to be effective.

(b) The Cerambycid *Phoracantha semipunctata* F. previously reported to be comparatively rare in Mauritius, was found in Crown Forest at Belle Vue in large numbers attacking felled tres of *Eucalyptus tereticornis* Smith. Damage was severe, the timber being rendered completely unfit for use. Living trees were not attacked.

6. Shipment abroad of beneficial insects

(a) At the request of the French authorities, four shipments of *Anaphoidea nitens* Gir. were sent by air to Madagascar during September and October for the control of *Gonipterus scutellatus* Gyll. The shipments comprised a total of 438 parasitised *Gonipterus* egg capsules.

(b) A single consignment of *Scolia oryctophaga* Coq. was sent by ship to the island of Diégo Garcia, a dependency of Mauritius, for the control of *Oryctes tarandus* Oliv. which is reported to be causing considerable damage to coconut trees. The shipment consisted of 8 females and 14 males.

7. General

(a) Colonies of the mealy bug *Dactylopius tomentosus* (Lam.), were liberated in three localities where a recrudescence of Prickly Pear (*Opuntia* spp.) on a small scale had occurred.

(b) The sale of " Pvex " was continued during the year. Its composition was altered by the addition of 1·5 per cent of D.D.T., its retail price rising from Rs. 1.25 to Rs. 1.60 a bottle.

The preparation of Meta bait for the public was discontinued.

(c) Courses in Zoology and Entomology were given at the College of Agriculture by Mr. Mamet and the Entomologist respectively.

(d) Insects caught on planes arriving at the airport during the year were identified and found to represent 4 families of the *Hemiptera*, *Lepidoptera*, and *Hymenoptera*, 15 of the *Diptexa*, and also the *Blattidæ* and *Psocidæ*. It is hoped that the information so compiled will prove useful in the future.

(e) As usual, planters were visited and advice on the control of pests given whenever requested.

(f) The Colony was represented at the Imperial Entomological Conference by Mr. L. A. Moutia, who afterwards proceeded to Morocco as previously reported.

8. Publications

Mamet, R. 1948. A food-plant catalogue of the insects of Mauritius. Bulletin No. 30, Scientific Series, Dept. Agric., Mauritius, 74 pp. 34 refs.

Williams, J. R. 1948. A preliminary account of the project for the control of *Cordia Macrostachya* (Jacq.) Roem and Schult, *Herbe Condé*, in Mauritius *Revue* Agricole, Mauritius, 27, No. 5, pp. 214–233, 2 tables 9 refs.

Acknowledgement

The writer wishes to record his deepest gratitude to all members of the Division for their unceasing co-operation and support throughout the year.

J. R. Williams,
Entomologist.

Appendix 11

Division of Plant Pathology

1. Staff Changes

The Plant Pathologist, Mr. P. O. Wiehé, continued to act as Joint Secretary to the Economic Commission enquiring on the sugar industry of the island until 17th April when he left on leave for England previous to proceeding to Nyasaland, where he has been appointed Plant Pathologist to the Department of Agriculture. On his return from England on 8th October the Assistant Plant Pathologist, who had been acting Head of the Division since October 1947, resumed his substantive post.

The Acting Plant Pathologist was absent on sick leave from 17th May to 13th July when the Division was under the care of the Acting Assistant Plant Pathologist, Mr. E. Rochecouste. On 20th July the last-named officer was promoted as Assistant Botanist to the Sugarcane Research Station, and Mr. J. Duhamel, formerly Plant Inspector, who had been seconded to the Fisheries Department in April 1943, returned to the Department of Agriculture on 1st September when he was made Scientific Assistant of the Division.

2. Diseases of the Sugarcane

No major disease of the sugarcane attracted attention during the year. The cane M.134/32 which now occupies about 90 per cent of the area under cane cultivation in the Island, is fortunately resistant to gumming, leaf scald and smut diseases, three of the chief sugarcane diseases in the island. Had it not been so, in spite of being a high quality cane, it would not probably have met with the success of nearly doubling the sugar production of the island. That cane, however, caused much scare some years ago, when after having suffered badly from cyclone effects, it showed a high degree of susceptibility to red rot ; through good growth conditions, however, no widespread attack of the disease occurred during the last two years.

Reports of root disease on the same variety were received during the year from estates in Grand Port, Savanne Plaines Wilhems, Pamplemousses and Black River. An insufficiency of mineral plant food was suspected as the cause of the trouble in the first four districts, and the Sugarcane Research Station, which investigated the cases, ascribed their cause to a lack of phosphate in one case, of nitrogen in another and of potash in three others. Possibly M.134/32 being a rapid grower and a heavy yielder did not receive at some places sufficient amounts of the required fertilizers through shortage of supplies, with the result that growth failures resulted in areas where the soil conditions were rather poor.

In Black River the case of root disease occurred only at a confined spot in one field, a lack of some minor element or perhaps the presence of some toxic mineral was suspected, but the exact cause of the trouble was not discovered. The symptoms disappeared later, following the advent of rains.

3. Leaf Curl Tobacco

During the month of August, a diseased tobacco plant was brought to the laboratory by the Chief Tobacco Inspector. The symptoms exhibited corresponded to those of leaf curl disease. The diseased plant had come from a field near The Vale in Rivière du Rempart district and, following a survey of the whole area under tobacco in the North of the Island, where about 200 tobacco planters were cultivating somewhat more than 200 arpents, 9 diseased plants were discovered.

The following observations were made: no mottling was present and the puckering of the leaf surface was brought about by curlings of the midrib and of the veins of the first order proceeding from the midrib. Greening of small vein portions was present on the undersurface of the leaves and resulted from linear, frilled swellings developing laterally for short lengths along both sides of the veins, the latter running as a clear line between the two ridges of tissue formed. The thickenings occurred most often along the smaller veins, but were also observed along bigger veins, even along the midrib, and showed various degrees of development, from mere swellings to small, sessile, cup-like, leafy structures (enations).

Graft experiments, intended to be chiefly of an exploratory nature, were made and artificial transmission by means of white flies was left for future operations. Fifteen grafts with diseased material were made in October on to healthy plants in an isolated field in the diseased area, and three grafts on healthy plants growing in tins at the Central Experiment Station. Unfortunately, the weather was excessively dry until the end of the year and all the scions and buds grafted in the field failed. The grafts at Réduit succeeded but did not result in general leaf curling effects ; there was some twisting and thickening of the leaves but only a few enations were produced. The general picture suggested however, that infection had been picked up.

The low incidence of the disease observed in the fields is particularly striking, and it is possible that the vector was not particularly abundant at that time of the year when the disease occurred. The white fly *Bemisia*, found elsewhere to be a vector of leaf curl, does apparently exist in the island.

Photographs of diseased plants and coppered leaf material showing the enations were dispatched to the Secretary, Department of Agriculture and Lands, Southern Rhodesia, for examination by Dr. Hopkins. Reply was received in November that the symptoms exhibited appeared to be typical of leaf curl.

Legislation is to be introduced before the beginning of next planting season to deal with possible future outbreaks of the disease.

4. Disease of earthnut

At the request of the Executive Officer of the Food Production Board, the Victoria Bunch earthnut plantations in the island were inspected in February, owing to the occurrence of a severe wilt disease on the crop. The seed used had been imported from Uganda.

Bacterial wilt, caused by *Xanthomonas solanacearum* (Sm.) Dowson, was observed present in practically all the fields visited and the opinion reached as a result of the inspections was that V. Bunch was too highly susceptible to the disease to constitute a profitable crop under Mauritius conditions. It was in consequence recommended—

(i) that the further cultivation of the V. Bunch peanut be stopped ;

(ii) that in exceptional cases, plantations of that variety could be made on new land or on land which had not been under susceptible crop for a number of years previously ;

(iii) that the variety known locally as *Cabri*, which was found to be highly resistant to the disease, be provisionally considered as the standard variety in the island ;

(iv) that as the *Cabri* is susceptible to a certain extent to stem rot, caused by *Sclerotium Rolfsii* Sac., chiefly when neaing maturity, other varieties should be imported and small comparative trials made to determine their reaction chiefly towards these two diseases.

5. Bacterial Wilt on other plants

Bacterial Wilt is known to occur on very many plants belonging to a wide range of families, besides the Solanaceae ; in Mauritius, however, it has only been recorded on the peanut (family Leguminoseae), besides a number of solanaceous plants, and very occasionally on the Zinnia plant. During the inspections mentioned above, it was frequently observed that the disease existed in fields which had been for example under sugarcane for a number of years, and attention was focussed, although cursorily on the weed population. As a result, wilted plants of the following species were observed in the diseased fields—

Phyllanthus spp., locally known as " curanelli " ;

Asystasia gangetica T. Anders, " herbe pistache " ;

Portulaca oleracea L., or " pourpier " ; and

Oxalis corymbosa D.C., " Grosse oseille."

Gum ooze was observed from the cut stems of the first three weeds named and from the cut petioles of the last-mentioned one. Inoculation of tomato plants with cultures from *Portulaca* and *Phyllanthus* produced brown, longtitudinal lesions in the stems which slowly oozed gum when cut. Research work with the other diseased plants named could not be carried out.

6. Filao Wilt

In the Annual Report for 1923 and later ones, mention was made of a disease of the filao (*Casuarina equisetifolia* L.) referred to as the " Smut " disease, owing to black, sooty masses of spores of the fungus *Trichosporium vesiculosum*—being present under the bark. The primary cause of the trouble was, however, considered to be due to some root parasite, the smut fungus being supposed to be secondary in nature.

In April of the year under review, young filao plantations on the coast were inspected on an estate in Grand Port where plants had been reported to be dying. The disease was seen to be characterised by a yellowing and drying of the small, green branches which in the plant carry on the work of normal leaves. These branches drop off in large numbers and the disease progresses slowly until the death of the tree.

Examination of cut portions of the stem tissues showed the central wood to be much darkened in colour, the affected region being very irregular and wavy in outline. An abundant dirty white to dark-coloured gum ooze was observed from the cut surfaces of the diseased stems, from which bacteria was obtained in culture. Inoculations were made into tomato plants, but absence on illness, as already mentioned, interrupted the work.

The investigations were resumed towards the close of the year when advice was sought by an estate on the coast in Savanne district, where tall trees were reported to be dying. Upon inspection, gum ooze was found to be also produced by the diseased trees, but to be absent or practically so from regions of the plant long dead.

In this circumstance, the interesting observation was made that several dying trees producing the typical gum exudation on being cut were also showing the smut fungus in the bark. The inference drawn from the observations at this stage of the work is therefore that the undetermined "root parasite" spoken of in early years is most probably *Xanthomonas solanacearum,* the bacterium referred to in the preceding paragraphs.

7. Wilt of the Royal Palm

It was mentioned in last year's report that a wilt of the royal palm (*Roystonea regia* O. F. Cook), detected in the wooded district of Black River in a place remote from sugarcane plantations, had been found to be different from the bud rot disease caused by the sugarcane gumming disease pathogen *Xanthomonas vasculorum* (Cobb) Dowson.

The existence of the disease had been notified late in December 1947, and when examined, the plants were found to be in an advanced stage of decomposition. They were tall, 13 year-old plants, and two were seen diseased. The chief symptoms observed were: Death of leaves of the crown, proceeding apparently from the outer ones inward, and collapse of the stem tissues from the base upward. The attack on the internal tissues caused the stem to yield easily to presure exerted on the outside and this differentiates the disease from that caused by *X. vasculorum, in* which case the standing stem remains quite firm in texture even long after the crown shaft has slipped down.

The mechanical weakening of the stem tissues results in the upper part of the stem falling over, but remaining connected with the remainder of the stem. When that occurs, the heart leaf is still quite green, whilst the first opened leaf may still be partially so.

The ground tissue of the stem is affected by a soft rot from the base upwards, leaving the vascular bundles a mass of loosened fibres.

Cultures made on *Peptone Saccharose* agar. of the pith tissues from apparently newly affected regions, yielded all a quick-growing, gas-producing bacterium, while dilution cultures on acidified agar of a suspension of small, black masses from the rotting tissues at the base of the stem produced fungus growths with an abundant white, upright, cottony mycelium. Within the medium numerous small, black, sporocarp-like masses were present, but no spores were observed on crushing them.

A transfer from such a growth was inoculated into young royal palm plants growing in bamboo pots, but up to the end of the year, only one inoculated plant and one of the controls had died ; the cause of the death not being ascertained.

8. Banana diseases

(a) It was reported in the last annual report that a banana disease of the *Marasmius* type had been detected in the island and that a fungus had been obtained from the diseased tissues. The inoculations made this year did not unfortunately confirm it to be the agent of the disease.

(b) It was also stated in the same report that a disease of an obscure nature existed on the dwarf banana (*Musa cavendishii* Lamb.). The disease was this year reported from a plantation at Nouvelle France, but no organism was obtained from cultures made of the diseased tissues.

9. Minor diseases

A rather severe attack of potato scab caused by *Actinomyces scabies* (Thaxt.) Güss occurred in the Montagne Longue area in several plantations raised from market consignments received from Australia. No treatment could be effected.

A number of diseases were also investigated on various plants, e.g., a disease of lawn grasses, an avocado blight, a die-back of guava plants, and a disease of Kudzu (*Pueraria thumbergiana* (Sieb and Zucc.) Benth.).

10. Control of Imported Plant Material

The inpection of imported plants and plant products continued to be under the supervision of the Division. Mention of the insects collected by the Plant Inspection Service in incoming planes at Plaisance airfield will be made by the Entomologist in his report.

The cane varieties H.32–8560 and Q.28 were received from Australia in January and planted in the Cane Quarantine Greenhouse where were also growing the Canal Point canes which had been received from the U.S.A. Department of Agriculture in December 1947, these varieties being C.P.34–120, C.P.36–13 and C.P.36–105.

Cuttings of B.H.10/12 and Co. 290 were also planted in the greenhouse and the spindles used later for testing by Sein's method the possibility of the introduced canes being carriers of mosaic disease. The reaction was negative.

A second generation of the canes was raised in the greenhouse in September. The new crop is still apparently healthy.

11. Miscellaneous

Lectures in Botany and Plant Pathology were delivered during the year to the first, second and third year students by the Acting Plant Pathologist and Acting Assistant Plant Pathologist. When the latter officer was promoted to the Sugarcane Research Station (*See* Staff Changes), his lectures to the first year students were delivered by the Registrar of the College.

A paper by Mr. P. O. Wiehe entitled "The Plant Diseases and Fungi recorded from Mauritius" was published as Mycological Papers, No. 24, by the Commonwealth Mycological Institute, and an article by the writer on bud rod of the areca nut palm (Areca Catechu L.) was published in the November–December issue of *La Revue Agricole de l'Ile Maurice*.

The valuable assistance received from Dr. J. C. F. Hopkins and and Dr. G. R. Bates of the Department of Agriculture and Lands, Southern Rhodesia, in connection with the outbreak of leaf curl disease of tobacco mentioned in this report, and from Dr. G. R. Bisby of the Commonwealth Institute of Mycology, in the identification of specimens of plant diseases, is gratefully acknowledged.

G. Orian,
Plant Pathologist.

Appendix 12

Chemical Division

1. Aloe Fibre

Investigation Work

(a) Automatic decorticator. The new aloe fibre scrapper invented by Mr. L. Humbert presents new features. In order to study the advantages of this decorticator, it was decided, with the approval of the inventor, to erect at Réduit Experimental Station a replica of this machine. The construction of this however has not yet been completed.

(b) Aloe wax. A preliminary study of aloe wax was undertaken. Aloe leaves were gently scraped ; the wet scrapings average 7·42 per cent of the green leaves with a moisture content of 76·9 per cent. Alcoholic extract of the dried scrapings give a dark green waxy substance with an average yield of 33 per cent. The alcohol-free substance is soluble in turpentine but insoluble in the ordinary solvency viz., benzene, ether, petroleum and acetone ; the melting point is about 65°C.

2. Alcohol

In order to determine the average chemical composition of exported alcohol, samples collected from 9 local distilleries were analysed and the following figures were obtained—

TABLE I

Analysis of Colonial Spirits for Export

Distilleries	*No. of sample*	*Total solids per litre*	*Secondary constituents (Parts per 100,000 abs : alcohol)*					*Regie at 15°C*	*Total secondary constituent*
			Acids	*Esters*	*Aldehydes*	*Higher alcohols*	*Furfural*		
A	1	·003	Nil	15·84	4·22	1·66	Nil	94·6	21·72
	2	·006	,,	4·40	4·40	1·77	,,	94·6	10·57
	3	·001	.07	5·30	4.40	0·30	,,	94·6	10·67
B	1	·009	·12	4·40	2.99	30·00	,,	94·6	37·51
	2	·003	·12	5·30	2·73	26·10	,,	95·0	34·25
	3	—	·18	3·52	5·28	21·40	,,	94·3	30·38
C	1	·036	alkaline	3·17	1.67	34·80	,,	92·8	39·64
	2	·012	,,	7·04	1.72	43·20	,,	93·5	51·96
	3	·011	,,	5·28	1·71	47·00	,,	93·4	53·99
	4	·018	·06	7·90	1·76	15·80	,,	94·6	25·52
	5	—	·18	3·52	2·20	23·10	,,	94·3	29·00
D	1	·002	·12	14·10	5.72	21·40	,,	94·1	41·34
E	1	Nil	·06	5·28	0·97	20·00	,,	94·9	26·31
	2	,,	·12	4·40	0·79	20·00	,,	94·9	25·31
	3	,,	·12	7·04	0·70	20·00	,,	95·7	27·86
F	1	—	·06	1·76	1·76	15·80	,,	95·5	19·38
	2	—	·06	1·76	0·88	16·70	,,	94·0	19·40
	3	—	·12	1·76	1·76	18·20	,,	95·1	21·84
	4	—	·18	5·30	1·32	18·50	,,	95·7	25·30
	5	—	·06	1·76	1·32	17·10	,,	94·8	20·24
G	1	—	·18	7·04	3·52	31·50	,,	94·0	42·24
H	1	·008	·06	7·90	1·76	18·50	,,	94·6	27·22
	2	·004	·24	3·52	1·30	19·30	,,	94·2	24·36
	3	·005	·24	3·52	1·30	18·10	,,	94·2	23·16
	4	—	·18	4·40	3·96	10·20	,,	94·0	26·74
I	1	—	·18	7·04	2·64	21·40	,,	94·6	31·26

3. Tobacco

(a) The selection experiments were continued at Réduit Experimental Station. Leaves collected from plants obtained from selected seeds have again shown an improvement in their sugar content. The seeds from the plant sown last year (with a sugar content of 14·9 per cent) have given plants with a sugar content of 15·1 per cent, the seeds of the latter were sown again and the figure raised to 15·85 per cent with a nitrogen content of 2·26 per cent giving a carbohydrate ratio of 7·01.

(b) In order to ascertain the effect of Nitrogen, Phosphorous and Potassium respectively on the quality of the leaf (the sugar content being taken as a criterium), tobacco plants received the following manurial treatment and the results of analysis are tabulated below—

N = 16 kgs N per acre P = 50 kgs P_2O_5 per acre K = 6 kgs K_2O per acre
N_1 = 32 ,, P = 70 ,, K_1 = 18 ,,

Fertilizers :	NPK	NPK_1	NP_1K	N_1PK	NP_1K_1	N_1PK_1	N_1P_1K	$N_1P_1K_1$
% reducing sugar in leaf	8·8	8·6	8·2	9·1	8·8	10·2	6·6	6·9

4. Nutritive value of grasses

Three grasses *Melilotus indica, Medicago dendiculata* and *Vicia sativa* are widely distributed all over the island, although the latter is thriving only in wet districts ; in order to ascertain the food value of these plants, samples collected from different places and taken at different stages of growth were analysed and the following figures were obtained—

TABLE II

	Locality	*Moisture* %	*Fat* %	*Fibre* %	*Protein* %	*Carbohydrate* %	*Ash* %	P_2O_5 %
Vicia sativa, advanced flowering and podding stage ...	Phœnix ...	82·3	0·73	5·00	3·40	6·84	1·73	0·10
,, advanced flowering and podding stage ...	Reduit ...	76·3	0·92	5·11	5·76	9·61	2·30	0·13
,, seedling ...	Phœnix ...	78·7	0·56	5·09	3·87	8·86	1·92	0·12
Medicago dendiculata, advanced and podding stage ...	Hermitage ...	81·8	0·81	4·92	3·28	7·32	1·90	0·09
Medicago dendiculata, advanced and podding stage ...	Phœnix ...	86·7	0·41	3·53	2·40	5·53	1·23	0·08
Melilotus indica, flowering stage ...	Cote d'Or ...	86·0	0·87	3·92	2·94	4·39	1·41	0·08
,, seedling stage ...	Phœnix ...	77·3	1·13	6·49	4·06	8·66	2·36	0·11

5. Rocks from "Ile aux Serpents"

Samples of rock were collected on the *Ile aux Serpents* with a view to ascertaining their value as a source of phosphatic guano.

The results obtained on the three samples analysed show their poor content in phosphoric acid—

Samples	*A*	*B*	*C*
P_2O_5%	1·72	0·21	3·95
N %	0·18	0·12	0·19

6. Compost

At the request of the Board of Commissioners of Curepipe, samples of the compost made of town refuse were analysed in order to determine its agricultural value. Two samplings were made the second one was collected three months after the first one, no marked change has apparently taken place during this period in the two composts:

	1st sampling		*2nd sampling*	
	A	*B*	*A*	*B*
Moisture	64·5	63·0	66·0	66·5
Total Nitrogen ...	0·32	0·32	0·36	0·36
Fixed ,, ...	0·28	0·31	0·35	0·35
Phosphoric acid ...	0·22	0·21	0·31	0·30
Potassium Oxide ...	0·36	0·33	0·37	0·34

7. River sand

Enquiries are often made about the composition of local river sand ; a typical sample was secured and analysed. The following figures are worth recording–

	%		%
Fine sand ...	3·19	Organic matter ...	0·27
Coarse sand ...	60·13	Chlorides (as NaCl) ...	0·0058
Silt	0·89	Calcium carbonate ...	1·47
Clay	0·056	Constitutional water ...	0·102

Milk analysis

The analysis of samples of milk from the Government Dairy was performed as usual. The sampling was performed in February, May, August and October. The average figures are satisfactory—

	Total solids %	*Fat* %
Morning	12·05	3·5
Evening	13·32	4·6

Routine analysis

137 samples were received involving 410 determinations. The preparation and standardization of acid and alkali solutions for estates were carried out as usual.

Miscellaneous

As usual, courses in agricultural and organic chemistry were delivered during the year to students of the College of Agriculture by the Chemist and the Assistant Chemist respectively, the Scientific Assistant acting as Demonstrator in Practical Agricultural Chemistry.

The Chemist was acting as Officer in charge of the control of fertilizers.

Mr. E. Haddon was in charge of the work in connection with the aloe fibre investigation.

R. Lincoln,
Chemist.

Appendix 13

Agricultural Division (Rodriguez)

Climatic Conditions

RAINFALL AT OYSTER BAY

Months	*Inches*	*Rainy days*	*Months*	*Inches*	*Rainy days*
January	2·25	12	July	3·15	17
February	7·30	12	August	4·64	18
March	6·31	18	September	1·16	11
April	4·87	19	October	1·78	11
May	2·04	11	November ...	0·63	6
June	1·21	11	December ...	2·95	13
Total amount recorded ...	38·29 inches		Total No. of rainy days...		159

General Conditions

The year 1948 was in general favourable. The rainfall though slightly under the average was more or less evenly distributed, the months of May and June were exceptionally dry and this influenced to some extent the crop of beans.

The overstocked pasture plains were quite dry in November, breeders were allowed to let their cattle stray during the night. This however did not last long as some showers fell in early December.

The pig market was full and the selling price varied between 65 and 90 cents per pound ; fowls were abundant and the prices ranged between 40 and 95 cents a pound throughout the year.

Experimental Station

Varietal experiments were continued with different varieties of Manioc, Sweet Potatoes, Yams, Beans. It was interesting to note that one of the dwarf varieties of Manioc produced locally from seeds, the R44, ranked among the heaviest yielders.

The following is a list of the different planting materials given to local planters—

Bread fruit	87 plants	
Sweet Potatoes	1800 cuttings	... To school garden Lataniers
	1950 cuttings	... To 14 persons
Bean seeds ...	96 lbs ...	... On loan to 19 persons
Manioc cuttings ...	8583 cuttings	... To 157 persons
Vegetable seeds ...	delivered to 10 persons	
Lucern seeds ...	400 grams	... To Port Mathurin Government School
Economic plants ...	1112 plants	To 46 persons.
Ornamentals ...	250 plants	

Stock Farm

Cattle

Friesland :

Birth ... ... None
Death ... ... 1 Bullcalf
Present No. ... 2 cows and 1 bullcalf

Africander :

Birth ... ... None
Present No. ... 1 cow

Pig

Large Black X Large White :

Present No. ... 1 boar
No. of services ... 18

Donkey

Catalonian :

Birth ... ... 3 Jenny foals
Present No. ... 3 Jacks and 8 Jennies

Poultry

Turkey American Bronze :

Sold ... ... 12 cocks and 10 hens for Rs. 216.50 c.
Sold ... ... 90 eggs for Rs. 7.50 c.
Placed under broody hens 272 eggs, of which 96 chickens were obtained ; 84 of them died and only 12 were alive on the 31.12.48. Most of them died of Chicken Pox.
Present No. ... 4 cocks and 11 hens

Hens Rhode Island Red :

Sold ... ... 1 sterile cock for Rs. 6.50
Present No. ... 3 cocks and 7 hens
Given ... ... 1 cock and 3 hens to school Farm, Port Mathurin.
Sold ... ... 1,215 eggs
Broken and soft ... 30 eggs
Placed under broody hens 104 eggs of which 11 chickens were obtained.

The Rhode Island Red introduced by Mr. Jauffret, the ex-Agricultural Officer, are doing very well in our poultry runs. The breeders who bought eggs of Rhode Island Red from the Stock Farm were unanimous to state that the local poultry was superior to the Rhode Island Red on account of the latter's comparatively poor foraging abilities. That opinion was also confirmed by the Head Teacher of Port Mathurin Government School, to whom some Rhode Island Red were given for the School Farm. He wants to return the birds to us.

Land Tenure and Prevention of Soil Erosion

Nothing could be done since the departure of Mr. Jauffret on account of the change of officers and of the instruction course Mr. Guerandel, the new Agricultural Officer, had to follow.

Plant Pests and Diseases

In May, reports came from farmers of the North and North East parts of the island, that an insect was damaging their plantations of maize. An inspection held by the Magistrate, the Senior Forest Officer and the Agricultural Officer revealed that thousands of locusts, the Nomadacris septemfasciata, were attacking maize plantations chiefly those where the cobs were nearly mature at St. François, Grenads, Roche Bon Dieu, Trèfle, Trois Soleils, Patate Theophile and Decide.

The following steps were taken to control the attack—

(a) Spraying of the attacked and surrounding fields with Arsinette. This did not prove to be very effective.

(b) Poisoned baits containing maize bran, syrup, and Agroxide 7 as insecticide were spread over the infested areas. This proved to be more effective as hundreds of dead insects were found in the fields where the poisoned baits had been applied.

The insect made an attempt to spread over the island. Isolated swarms of locusts were found in maize fields at Mt. Venus and Vangassailles and in the cattle walk at Pte. Rond, Pte. Mangue and Pte. Manioc. Though the insect was not doing any sensible damage poisoned bait was spread all over the infested areas.

Sixty-seven pounds of maize bran was used in the preparation of the poisoned bait that was applied to the infested localities.

As a whole, the locust did not do much harm, and inflicted sensible damages to about 4 acres of maize.

By July, the antilocust campaign was at an end as the insect had disappeared.

P. GUERANDEL,
Acting Agricultural Officer.

Appendix 14

Legislation

The following Ordinances, Proclamations and Government Notices were issued during the year—

Ordinance No. 4—To amend the Sale of Canes (Control) Ordinance, 1941.

Ordinance No. 22—To amend the Tobacco Production and Marketing Ordinance, 1943.

Ordinance No. 45—To validate a resolution of the former Council of Government increasing the excise duty on leaf tobacco.

Proclamation No. 34—To restrict the exportation of sugarcane planting materials.

Government Notice No. 162—Regulations made under Section 6 of the Registration of Agricultural Chemists Ordinance, 1944.

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